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WATER CISTERNS OF RURAL SETTLEMENTS IN SOUTHERN ANATOLIA IN LATE ANTIQUITY AND THE BYZANTINE PERIOD

ANADOLU'NUN GÜNEYİNDEKİ KIRSAL YERLEŞMELERDE GEÇ ANTİK VE BİZANS DÖNEMİ SU SARNIÇLARI

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ABSTRACT

No extensive work has been published to date concerning the cisterns of southern Anatolia. Nor does the recent research present a comprehensive approach especially to the association of cisterns with buildings and open spaces as well as their stylistic features. From this point of view, this paper aims to fill a part of this lacuna by examining the potential role of cisterns located in the Late Antique-Byzantine countryside of southern Anatolia, namely in the areas of Lycia, Pamphylia, Isauria and Cilicia, on the basis of both archaeological and written evidence as well as the author's observation in the field. In this study, cisterns are evaluated under three main themes. The first presents such basic characteristics of the cisterns as form, material, capacity, decoration, construction techniques and purposes whilst it also examines the water sources and the ways of feedings of the cisterns. The second theme discusses the essential reasons for locating the cisterns at any point of the unstructured spaces of the settlement core such as streets, paths, alleys, public spaces and, of the land situated in the close vicinity of the inhabited area. The last section analyzes the associations of cisterns with churches along with their annexes, houses, olive oil and wine workshops in terms of function and location.

Keywords: *water supply, cistern, village, Late Antique countryside, Byzantine countryside.*

ÖZ

Anadolu'nun güney kıyılarındaki kırsal yerleşimlerde en sık karşılaşılan yapı tiplerinden biri olan sarnıçlar, doğrudan kapsamlı bir inceleme konusu olmamıştır. Diğer bir yandan, bu mütevazı yapı tiplerinin detaylı bir şekilde irdelenmesi sonucu, sarnıçlar ile yerleşimi oluşturan yapı grupları, boş alanlar, sokaklar ve bu merkezi alan dışındaki tarımsal alanlar arasında, mantıksal ve işleve dayalı birtakım düzenlerin kurulduğu anlaşılmaktadır. Buradan hareketle bu çalışmada, Anadolu'nun Akdeniz kıyısındaki Likya, Pamfilya, Isauria ve Kilikia bölgelerinde Geç Antik ve Bizans dönemlerinde kullanılan çiftlik, köy ve manastır gibi kırsal yerleşmelerdeki sarnıçların, yapılar ve yapısız alanlar ile arasında

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kurulu bağları, arkeolojik kalıntılar ve dönem kaynakları ışığında ilk kez bütünsel bir yaklaşımla ele alınmaktadır. Bu ilişki, giriş niteliğindeki ilk bölüm haricinde, iki ana tema içinde sunulmuştur. Bu bağlamda ilk başlık altında sarnıçlar antik dönem isimlendirmeleri, kullanım alanları, biçim, yapım malzemesi, yapım tekniği, örtü biçimi, harç yapısı, kapasite, süsleme, su çekme yöntemleri, inşalarına dair dönem kaynakları, su beslenme kaynakları ve su tedarik sistemleri açısından hem söz konusu bölge hem de çevre Akdeniz coğrafyası örnekleri ışığında anlatılmaktadır. İkinci başlık, sarnıçların yerleşim merkezi ile yakın çevresinde bulunan yapısız ya da seyrek yapılı alanlara yerleştirilmelerindeki olası sebepleri iki ana grup altında incelemektedir. Bu kapsamsa ilk grupta kırsal yerleşim çekirdeğindeki sokak, patika ve olası ortak kamu alanına yerleşen sarnıçların belirgin bölge örnekleri tartışılırken, ikinci grupta kırsal iskân alanının etrafında konumlanması beklenen bağ, bahçe, tarla, harman yeri ve otlak gibi alanlarda tespit edilen sarnıçlar irdelenmiştir. Doğrudan yapılarla olan ilişkilerin ana paragraflar halinde incelendiği üçüncü ve son başlık, arkeolojik ve kısmen yazılı verilerin nispeten daha çok detaylandırılabilmesi sebebiyle, makalede sarnıçların işlevlerine dair en kapsamlı veriyi sunmaktadır. Makalenin son kısmını oluşturan bu bölümde sarnıçların kilise, kiliseyle bağlantılı ek yapılar, konutlar, zeytinyağı ve şarap işlikleriyle olan işlevsel ve mimari bağlantıları kapsamlı bir şekilde incelenmiştir. Bu inceleme sonucunda, bölge kırsalındaki kiliselerde yer alan sarnıçların çoğunlukla atrium/ avlular ile yapı duvarlarının hemen dışına; nadiren ise narthekslere, ek mekanlara ve naoslara yerleştikleri belirlenmiştir. Mevcut arkeolojik veriler ve yazılı kaynaklar, kiliseyle ilişkili bu sarnıçların ayin öncesi ve sırasındaki çeşitli su gereksinimlerine hizmet etmesinin yanında, domestik işlevlere sahip olabileceğine de işaret etmektedir. Kırsal konutlardaki sarnıçlar benzer şekilde çoğunlukla avlular ile yapı duvarları dışında yer alırken, bazı örneklerde yapı içinde konumlandıkları tespit edilmiştir. Suyun en yoğun şekilde istifade edildiği bu konut yapılarında sarnıçlar yemek pişirme, temizlik, yıkanma, tuvalet ihtiyacı giderme, su içme, suvarma, zeytin, üzüm ve tahıl gibi ürünlerin işlenmesi, küçük çaplı bahçe sulaması ve el işleri gibi büyük bir bölümü avlularda gerçekleşen işlerin yapılması sürecinde büyük bir rol oynamış olmalıdır. Bölümün son kısmını oluşturan zeytinyağı ve şarap işliklerinin halihazırda sarnıçlara sahip konutlarla bağlantısı bulunmayan bağımsız örneklerinde sarnıç kullanımının oldukça seyrek olduğu gözlemlenmiştir. Şarap üretim aşamasında su kullanımının istisna olması sarnıçların bu tip işliklerdeki seyrekliğini açıklayabilirken, üretiminin hemen her aşamasında ihtiyaç duyulan suyun depolandığı sarnıçların bağımsız zeytinyağı üretim işliklerinde ender bulunması, çevreden yapılan olası taşıma su pratiğini akla getirmektedir.

Anahtar Kelimeler: *su tedariki, sarnıç, köy, Geç Antik dönem kırsalı, Bizans dönemi kırsalı.*

Cisterns as Water Storages and Delivery Structures

Being one of the most utilized type of water storage, cisterns became indispensable in the countryside in that they provided water for everyday requirements of communities such as slaking the thirst, washing, cleaning, irrigation, handicrafts, large and small-scale industrial needs, liturgical rites and so forth. A water cistern is basically a reservoir built to capture and store water[1]. A couple of words obtained from written evidence refer to such a meaning in Antiquity, the most common of which are ἡ δεξαμενή (dexamenē) and τό λάκκον (lakkon)[2]. Cisterns have predominantly been built as underground structures mainly carved deep into the bedrock. Where no rock layer was available, a cistern would be constructed by digging a pit in the ground[3]. Apart from such underground tanks, aboveground built cisterns, largely made of rubble or ashlar masonry also existed. Some cisterns included stone steps leading to the lowest point of the structure. In the absence of steps, which is the case in the majority of examples, portable ladders may have been used. Both of these solutions were sufficient for those who attempt to reach to the bottom with a view to cleaning, drawing water and the like in case of need[4]. Cisterns are usually covered by a barrel vault, or by one or several stone slabs and are supported by arches, piers or columns placed in the center, as well as, if rarely covered by a wooden roof[5]. The inner surface of cisterns is lined with a layer of waterproof hydraulic coating to prevent seepage, be they hewn from the rocks or constructed from masonry[6]. Only those rock-cut cisterns without any crack required no plaster[7].

In respect to Mediterranean Anatolia (Lycia, Pamphylia, Isauria and Cilicia), the general characteristics of the cisterns of Antiquity and the Byzantine period given above are valid, in terms of function, building techniques, roofing and inner layers of plaster. Of all the plan types employed in the region, such as circular, square, and rectangular, it is the circular-cylindrical, that appears to be the most prevalent in the religious, and particularly secular context throughout the rural settlements of Lycia and presumably Pamphylia[8]. These cisterns are mostly rock-hewn, sealed with pinkish or reddish cement

1 Tsuk, 1997, 12; Harris, 2006, 212.

2 Uzunoğlu, 2018, 87.

3 Tsuk, 1997, 12.

4 See also, Hodge, 2000, 21.

5 For columns and piers supporting the roof of the cisterns from Anatolian cities see Kürkçü, 2015a, 307-8; Aktaş, Dündar, Erkoç and Koçak, 2015, 96. For the countryside of Rough Cilicia see Aydınoğlu, 2019, 56. In general see also, Hodge, 2000, 21. For a cistern square in plan and covered by two large stone slabs see Kürkçü, 2015a, 307. For a cistern covered probably by a wooden roof from a rural settlement in the territory of Sia in Pisidia see Kürkçü, 2015b, 124. See also, Hodge, 2000, 21. Those covered by a vault or only by a small stone slab as well as supported by arches will be exemplified in the text separately.

6 For the recipe of Byzantine hydraulic mortar by M. Kouppas, see Lethaby and Swainson, 1894, 231-32.

7 In general, see Tsuk, 1997, 12; Hodge, 2000, 21; Mithen, 2012, 82.

8 A number of publications and the remains observed suggest that cylindrical-circular variations

and become narrower towards the opening and described with shapes such as bottle, well, bell and pear-like. The rim or the opening at the top of the cisterns are typically framed by a circular or a rectangle cistern head or in other words, a well curb composed of a single monolithic stone, a row of blocks of stone, or constructed completely from masonry[9]. Since the aperture of the cisterns is narrow (it varies from about 30 to 50 cm.), they are covered with only a wooden lid or stone slabs rather than a large roof (**figs. 1e-1h, 2g, 2h, 3c, 3d, 7a, 8a-8b**). Such covers, together with vertically designed heads, protect cisterns from the sun which causes evaporation and from dirt such as dust, pollen, soil and so on, as well as preventing animals, people or other objects from falling into them[10]. The average capacity of these cisterns ranges from 20 to 50 cubic meters from some measured examples, with the exception of relatively large ones some of which could hold hundreds of cubic meters. While the former are mostly designed to meet the daily needs of households and their animals, the latter must have been intended for agricultural, industrial and water reserve purposes, as also to supply water for bathhouses (**fig. 2h**), if any[11]. There were many ways of drawing water from such cisterns[12]. Despite the lack of archaeological evidence, the traces of abrasion caused by the rope on the surfaces of some cistern heads, indicates the use of buckets. Pulley devices for pulling a bucket must also have been used in the region[13]. Cisterns of this sort, that share more or less common characteristics with those of Lycia and Pamphylia, have also been attested in rural Cilicia (**figs. 1a-1d, 6b, 8a-8b**)[14]. On the other hand, cubic or cuboid shaped cisterns covered

outweigh the other forms in the rural parts of the region. See Ormerod and Robinson, 1910 / 1911, 219; Kolb, 2008, 311; Akyürek, 2008, 303; İşler, 2014, 707-8; Erdoğan, 2019, 80; İşler, 2019a, 102; İşler, 2019b, 21. For rectangular or square shaped cisterns covered by a vault in rural Lycia and Pamphylia see also, Akyürek, Tiryaki and Kızılkayak, 2003, 22; Takmer and Önen, 2008, 113; Kolb, 2008, 311; Tiryaki, 2010, 456; Özer, Deveci and Taşkıran, 2011, 212; İşler, 2019b, 21; Erdoğan, 2019, 80-82.

9 For the instances of pinkish or red cement from the rural settlements in the region see Akyürek, Tiryaki and Kızıkayak, 2003, 22; Akyürek, 2008, 303; İşler, 2014, 707-8; Kürkçü, 2015b, 122; Erdoğan, 2019, 80; İşler, 2019b, 21. For the shapes in question see Çevik, 2000, 88; Harrison, 2003, 20, 24; Kolb, 2008, 311, 323; Akyürek, 2008, 303; İşler, 2014, 707; Baybo, Borchhardt and Yener-Marksteiner, 2017, 113; İşler, 2019a, 102; Erdoğan, 2019, 80; İşler, 2019b, 21. For such cistern heads see Harrison, 1963, 137; Kolb, 2008, 10; Akyürek, 2008, 303; Kopar, 2008, fig. 2; Yener-Marksteiner, 2015, 307; İşler, 2019b, 21-34; İşler, 2019a, 102; Erdoğan, 2019, 80, 134, figs. 43, 45, 47.

10 For the instances and in general see Peña, 1997, 165, 192; Tsuk, 1997, 12; Hodge, 2000, 21; Yener-Marksteiner, 2015, 307; Kürkçü, 2015b, 124; Erdoğan, 2019, 80-81; İşler, 2019b, 21; Aydınoğlu, 2019, 55, 56.

11 For the water needs of the rural communities and the relevant cistern types see also, Aydınoğlu, 2019, 57-58; Erdoğan, 2019, 86, 90.

12 For various ancient methods of drawing water from a source or a container see Oleson, 2000, 220-85.

13 Tsuk, 1997, 12-13; Hodge, 2000, 21; Kürkçü, 2015b, 125; İşler, 2019b, 21, 25, 28, 32-34; Erdoğan, 2019, 80-81.

14 For instance, see Eichner, 2011, figs. 170, 218; Aydınoğlu, 2013, 85; Aydınoğlu, 2019, 55-56.

largely by a vault, rectangular blocks or in some cases by a triangular roof seem to be more prominent in the rural settlements of Cilicia than those of a circular shape (**figs. 2a-2f, 6a, 8a-8b**)[15]. Several cisterns identified in the rural settlements of southern Anatolia, namely in the areas of Lycia, Pisidia and Pamphylia provide compartments of some kind (**fig. 2g**), akin to those suggested by Vitruvius[16], to ensure clean and probably drinkable water[17]. Some cisterns, especially from the countryside of Cilicia, that are supplied by rainwater, have an arched niche raising from the ground level and thereby exhibit at least in form, a structure similar to a fountain of some sort (**figs. 3a-3b**)[18]. Cisterns are mostly unadorned. In some instances, crosses scratched or painted on the plaster of cisterns[19], indicates a sort of apotropaic function and the consecration of water and of the reservoir itself. There are also a small number of cisterns, the head surfaces of which are incised with religious, floral, geometrical and figurative motifs (**figs. 3c-3d**)[20].

Literary sources unsurprisingly rarely record the individuals who initiated the construction of cisterns. Notables are known to have built cisterns in such places as cities, temples or sacred spaces in Antiquity. Such attempts were also made through the donations of a number of persons[21]. The trend seems to have continued in the countryside into the Late Antique and Byzantine periods given a couple of construction process. To exemplify this, the Apion Family, renowned for their large estates in Late Antique Egypt, built and repaired cisterns as part of the maintenance of irrigation systems in the countryside[22]. The documents offer telling information about the allocations, expenses, laborers and materials required such as bricks and stones related to the construction of the cisterns[23]. The construction and maintenance of cisterns within rural monastic complexes

Surveys on the rural settlements of Rough Cilicia carried out by the team led by Ü. Aydınoğlu still continue. For a study covering the cisterns of the territory, see Aydınoğlu, 2019, 53-70.

15 For some examples see Tiryaki, 2003, 132; Ceylan, 2009, 53, fig. 6; Aydınoğlu, 2010, 247-49; Eichner, 2011, 241, figs. 15, 51, 109; Aydınoğlu, 2013, 85; Aydınoğlu, 2019, 55, 56.

16 Vitr., *De arch.* 8.6.15. For the English edition see Rowland and Howe, 2001, 106.

17 Kürkçü, 2015b, 121, 125; Erdoğan, 2019, 81; İşler, 2019b, 23.

18 Harrison, 2003, 20 (Alakilise, House B1, Lycia); Aydınoğlu, 2013, 83, 85-86 (Paslı in Cilicia / Isauria); Aydınoğlu, 2017, 295-96 (Paslı and Karakabaklı in Cilicia / Isauria); Bala, 2018, 147 (Dana Island in Cilicia); Aydınoğlu, 2019, 58-59 (for a couple of examples from the rural settlements in Rough Cilicia). See also İşler, 2019b, 25 (Belören in Lycia).

19 Whether the crosses are contemporary with the cisterns is not explicit in the majority of examples although such practices point to the same symbolism in both cases, as stated above. For some examples see Seligman and Re'em, 2003, 250-51; Kopar, 2008, 177; Çevik, Kizgut and Bulut, 2009, 238, fig. 28; Ruggieri and Zäh, 2016, 27 n. 25, figs. 28-29. For a cistern frescoed after being converted to a chapel in Lycia see Masuda, 2010, 217.

20 Harrison, 1963, 137; Kopar, 2008, 177-78; Yener-Marksteiner, 2015, 307; İşler, 2019b, 24, 27-31, 33.

21 For example, see Uzunoğlu, 2018, 205-9, 433.

22 Jones, 1964, 792, 808.

23 Hickey, 2015, 74 n. 68.

could be likewise undertaken by a dignitary. In the *Typikon* of Kosmosoteira, dating to the second half of the 12th century, the founder sebastokrator Isaac Komnenos tells of a cistern that he began to build and gives advice to the superior and the monks regarding the conservation of the cistern and the water inside. He also elaborates on the materials to be used for the roof, which prevents "the sun and dirt" from entering the reservoir[24]. Although it is not possible to generalize from the small number of contemporary sources, it seems reasonable to say that, except for those built as part of a relatively common demand of a local community; the bulk of the cisterns in the rural settlements, most of which are connected to such a place as a house, workshop, garden or a small field, and thereby relevant to the nuclear family, must have been built or repaired directly by the ordinary households rather than by a patron. A comparable example of probably this type was found in a rural settlement called Buzağlık in central Lycia. We can consider this as remarkable evidence as we are not that familiar with cisterns bearing inscriptions. The head of the cistern was adorned on three sides with crosses in relief as well as an inscription that was incised on one side where one of the crosses cover a part of the surface. This inscription dating from the Early Byzantine period reads: "*Emmanuel! God is with us. I Kyriakos, I built it for myself and my children*" (**fig. 3d**)[25]. Many similar cistern heads without inscriptions but decorated with crosses and various types of ornamentation have been documented in the territory of Myra in Lycia, in both secular and presumably religious contexts[26]. Though no buildings have been distinguished which may be associated with the cistern head, given the characteristics of the structure as well as the content of the inscription, it can be suggested that, be it a part of a domestic or religious building, the cistern was the work of a modest initiative taken by the local inhabitant, rather than a relatively large-scale project.

Unlike dug-wells, primarily fed by underground water, cisterns may have various sources of water supply, such as springs, streams, lakes, rain and even snow-melt water. There are many ways of drawing water from natural water sources into cisterns as is attested from the written and archaeological evidence. In this context, one may basically classify the cisterns located in the countryside into two main groups according to their water sources, from the water delivery mechanisms.

The first encompasses the water supply systems established between the cisterns and natural water sources such as streams and springs. Whilst systems of this kind in some cases contain relatively sophisticated networks of water channels consisting of water bridges and water pipes, some include only a local dug or rock cut channels, with or without water pipes. Although it is mostly hard to establish the possible links among the cisterns, water channels and natural sources; a number of epigraphic, literary and archaeological evidence offer several valuable clues and insights into the practices of this first group. To illustrate, Uzunoğlu documented numerous Roman and a few Late Antique

24 For the English edition of the relevant passage of the document see Ševčenko, 2000, 833.

25 Yener-Marksteiner, 2015, 308, figs. 18-19.

26 For the examples see İşler, 2019b, 24, 27-30.

inscriptions which record the water sources and channels that belong to rural settlements such as *katoikia*, *kome* and *peripolion* situated especially on the western and southern coast of Asia Minor[27]. Another indirect information comes from a section of the text written in the life of Nicholas of Holy Sion in Lycia shortly after the death of the saint, in 564[28]. According to the miraculous story, an old spring of the village (*kome*) of Arnabanda suffered from pollution and the inhabitants along with their animals were on the verge of dying. The clerics of the village thereupon asked Nicholas for help. At the end of the story, the saint found another source of water in a nearby location, Mount *Kaisar*[29]. We happened to know that a woman intended to draw water from the first spring, however, since the main purpose of the theme is rather to emphasize the miracles of the Saint, we are not informed of any detail about the supply system of the springs to the village, if any. Nevertheless, the story is telling, in that it clearly shows that the springs are as crucial as the water channels and cisterns for the life of the villagers in the region. Water delivery systems associated with natural water sources are known to have been utilized in rural monastery settlements as well. For example, the Monastery of Kisleçukuru in Pamphylia, dated tentatively to the period of John II Komnenos[30], is supplied with a group of water mechanisms consisting of a water bridge together with water pipes, a water tower and a reservoir which is directly connected to the spring water situated to the northwest of the settlement. There is also a rectangular vaulted cistern within the monastery complex itself which is thought to have been fed by rainwater[31], rather than from the nearby water channel as might have been expected[32]. Similar arrangements were identified in several rural monastic settlements outside Anatolia. The inhabitants of the 5th century Monastery of Martyrius at Ma'ale Adumim near Jerusalem fed their cisterns via channels and cisterns from the water from the surrounding hills[33]. One can also glean from the *typikon* of the aforementioned Monastery of Kosmosoteira that the cistern located within the complex was filled with the water carried by the aqueduct and water pipes[34]. As may be inferred from the instances discussed above, although the archaeological and the written evidence do not always provide clearly detailed information as to the connection between springs and cisterns, it is evident that the rural inhabitants at least to a certain extent took many precautions and built their water supply systems to benefit from the natural water sources.

27 Uzunoğlu, 2017, 304-6, figs. 1-4.

28 I. Ševčenko and N.P. Ševčenko, 1984, 11.

29 *VNS* 20-24. For the sections 20-24 see I. Ševčenko and N.P. Ševčenko, 1984, 41-47. See also, Foss, 1991, 317.

30 Tiryaki, 2010, 457.

31 Tiryaki, 2010, 456.

32 For the cases in Constantinople see Crow, 2019, 229-30.

33 Brenk, 2004, 462.

34 For the related section of the *typikon* see Ševčenko, 2000, 833. For similar examples from other Byzantine monasteries see Talbot, 2002, 45-46.

The second group to be examined, under two sub-groups in terms of the filling method for a cistern contains aspects of the connection between rainwater and cisterns. Where no natural water sources were available or were insufficient, the inhabitants had to rely on rainwater and thereby, even if they in some cases had enough natural springs in their vicinity, they alternatively built rainwater-related constructions as much as possible, in order to avoid the negative effects of a potential period of lack of water. Such water supply mechanisms are more discernable than those relevant to springs in the rural settlements, because they commonly consist of simple setups.

The first subgroup contains those cisterns fed by storm water flowing along the ground surface. Numerous remains show that cisterns of this group usually lie on the vacant areas rather than within a building complex. In this method, water supply would generally be provided through incised channels, with or without pipes, that capture the run-off water either from the surrounding hillsides or from a relatively higher rocky part of the settlement and channel it into the cistern. Identification of the entire system of the former is rather difficult since it requires a comprehensive survey in the field. For instance, the cistern located immediately on south slope of the gate of the Kastron in Trebenna in Pamphylia is thought to have been supplied from the storm water flowing down from the Acropolis[35]. A similar method has been suggested for a cistern in Andriake in Lycia[36]. A more recognizable example of this type is attested in the so called Michael's Farm in the southern Negev. In the courtyard of the farmhouse is a cistern fed by storm water carried from the slopes via an incised channel[37]. This group also comprises those cisterns laying within the settlement, and appears to be the most prevalent or discernable between the two in the countryside of the region in question. Of the number of documented examples, some provides better preserved remains which enable us to identify the general layout. There are at least five cisterns in the vacant areas of the Roman-Late Antique village (*kome*) of Lyrboton Kome in West Pamphylia that are probably fed with storm water flowing from the relatively high rocky parts within the settlement core. One of them presents an all but complete example of this type. The pear shaped cistern is located in the street leading to the westernmost part of the village. There is one of the rocky sections of the settlement about 15 meters to the south of the cistern. A number of incised channels on the surface running from the rock direct the water to the mouth of the cistern (**fig. 3i**)[38]. A similar water supply system was discovered in the early Byzantine hamlet-like settlement of Lycia, Göynük Köte. At the north end of the vacant part of the settlement, which is assumed to have been a threshing floor, there is the cistern supplied by storm water carried from the adjacent rock via simple channels carved into the bedrock[39]. Ancient

35 Akyürek, 2005, 121.

36 Çevik and Bulut, 2010, 41.

37 Decker, 2009, 115, 195.

38 Erdoğan, 2019, 83.

39 İşler, 2019a, 95. For probably a similar example in the Early Byzantine rural settlement of Asarcık East in Lycia see İşler, 2009, 65.

roads in the close vicinity of rural settlements also present similar solutions concerning these superficial water supply systems. The channels incised on either sides of the part of *Via Sebaste* in West Pamphylia carry the storm water to the cisterns built at regular intervals along the route[40].

The second subgroup covers those cisterns fed by run-off from the roof and these are by far the most exploited amongst the water supply systems discussed above. When a cistern had a large roof, it would be filled by the rainwater flowing from its roof into the cistern through an aperture. On the other hand, the bulk of the cisterns in rural settlements, which are in most cases covered only by a lid rather than a roof as mentioned above, appear to be fed by the rainwater collected from the roof of a neighboring building. Cisterns of this type are generally located adjacent to, or very close to the buildings as well as in the courtyards and hence the conveyance of this rainwater is quite simple. Although the remains in most cases present only a part of the mechanism established between the roof and cistern, both the position of the cisterns and the presence of fragments belonging to the water transfer conduits, albeit rarely found, reveal that the rain water was channeled from the roof to cisterns by means of such components as gutters, downpipes and gargoyles (**figs. 3e-3h, 5b-5c, 6a-6b, 7a-7b**)[41]. Just as for the cisterns for storing provisions, so the rainwater cisterns might also be located within the rooms of the buildings on the ground floor. In that case, the run-off would be conveyed into cisterns via internal or attached pipes running along the wall.

Cisterns as a Component of Rural Settlements and Their Immediate Territory

The second matter to be discussed is related to the layout and possible functions of the cisterns laying within and around the inhabited area of the rural settlements such as villages, hamlets, farmsteads and monasteries. Forming a substantial part of the infrastructure of the countryside, cisterns were dispersed throughout settlements. It should be emphasized that in rural settlements having the lack of a permanent source of water, the inhabitants had to build as many cisterns as was possible wherever available, and therefore it is not always possible to associate the location of these cisterns with a specific function or reason. In other words, a cistern might have been built in a vacant area just because it was the most convenient place for it, to make use of potential storm water, or the area was simply suitable to construct such a cistern. On the other hand, given the fact that cisterns in the majority of cases are located by the nearest point of use, we can make some suggestions as to their functions in the light of the remains and the written

40 Takmer and Önen, 2008, 95.

41 For such conduit components in general see Harris, 2006, 332, 453, 483. For the examples from the Roman-Late Antique rural houses in Cilicia see Eichner, 2011, figs. 34, 227, 275, 391, 393-95. For Lyrboton Kome in Pamphylia see Erdoğan, 2019, 82. For the Late Antique village of Asarcık West in Lycia see İşler, 2009, 191. For Mnara in the Bey Mountains see Kizgut and Akalın, 2010, 117, fig. 5. For Church I on Gemiler Ada in Lycia see Masuda, 1995a, 57, 59. For Church IV on Gemiler Ada see Masuda, 1995b, 81.

sources. At this point, cisterns may be evaluated under two main titles from their location: those relatively scattered in vacant areas and those linked either directly or indirectly to the buildings of some kind.

Layout and Possible Functions of Cisterns in the Vacant Areas

Apart from the sections where a various types of buildings are densely clustered, there are also plenty of unstructured areas both in the nucleus and in the close vicinity of the settlements. These areas that contain cisterns can be defined under two main groups.

The first includes the vacant areas constituting a part of the core of rural settlements, which at times are considered as streets, paths, alleys, public spaces of any function or simply empty spaces outside the buildings. To exemplify, some Roman-Late Antique villages contain open spaces which are deemed a kind of public space probably for such purposes as social meetings of any reason, exchange of goods and shopping[42]. These square-like vacant areas appear to be commonly located at a specific part of the settlement and contain in many cases one or more than one cisterns. Such areas have been detected in several relatively well preserved villages in Isauria and Cilicia. The ancient village at Işıkkale, where an open space along with a cistern is located at the intersecting point of the streets, presents a clear example in this respect (**fig. 4b**)[43]. In the Late Antique villages of Akören I and Akören II, there are a couple of vacant areas with a cistern located along the highly visible main axes of the streets. Especially the one located immediately to the south of the settlement is suggested was a square[44]. Similar open spaces with cisterns, considered public spaces were also identified in the vacant areas between the clusters of houses in the village of Kanytellis (**figs. 2d-2f**)[45]. Lyrboton Kome in Pamphylia encompasses a great number of unstructured spaces with cisterns, some of which can also be interpreted as public spaces, especially those located on the main street running west of the settlement (**fig. 4a**) and immediately north of the main rock-cut opening of the eastern part of the settlement at which the main streets intersect[46]. On the other hand, such gathering or public spaces where cisterns are located are most of the time exceptional and apparently limited to villages. As already exemplified, the primary purpose for locating cisterns in the vacant areas of the inhabited core of rural settlements must have been to best utilize the vacant spaces and storm water, as well as to store reserve water, rather than creating a specific space. Therefore, one should regard such cisterns rather as an integral element of the water supply reservoirs, the function of which are in many respects basically similar to those cisterns associated with the buildings[47].

42 See also Chavarria and Lewit, 2004, 15; Varinlioğlu, 2008a, 297.

43 Varinlioğlu, 2008b, 55, 57, figs. 20-21; Varinlioğlu, 2008a, 297, 300. For a similar example in the rural settlement of Manastır in Cilicia see Eichner, 2011, 461, fig. 302.

44 Rheidt, 2011, 196, 200, figs. 3, 11.

45 Ceylan, 2009, 51, 54; Aydınoğlu, 2015, 19.

46 Erdoğan, 2019, 22-23, figs. 4, 12.

47 Some of the cisterns located in the vacant areas of the rural settlements contain rock-cut or portable troughs, apparently for watering animals and filling containers easily. For the examples

The second group are found in the land immediately outside of the inhabited area, including such cultivated or uncultivated parts as orchards, vineyards, fields, threshing floors and pastures[48]. In some cases, cisterns have been somehow related to these areas as well. Evidence from both late antiquity and the Byzantine period demonstrates that cultivated lands surrounding rural settlements were equipped with various water supply systems, among which the cisterns played an active role. For instance, the agricultural terraces endowed with cisterns for irrigation were archaeologically discovered across the countryside of Palestine and Arabia[49]. Innumerable cisterns were identified in the arable fields nearby the Byzantine village of Samaria[50]. Textual sources also provide information about the presence of cisterns in fields. An *Oxyrhynchus* papyrus dating from the 6th / 7th century refers to a cistern built to supply water for the irrigation of the lands[51], whilst the Nessana Papyrus dated to the 6th century mentions an orchard in the middle of which stood a cistern[52]. Similarly, Byzantine hermits constructed cisterns within the boundary of their monasteries to irrigate their lands[53]. Cisterns located in the vicinity of rural settlements as a matter of course have been utilized not only for irrigation. Numerous cisterns, in some cases together with watering troughs discovered in the territory of some rural settlements indicate to pastures and livestock raising[54]. It is needless to say that such functions for cisterns are also valid for the neighboring environments of the rural settlements in the Mediterranean Anatolia. For example, some cisterns located immediately outside the inhabited area of the Late Antique rural settlements of Yapısıgüzel and Karakabaklı in Cilicia / Isauria, as well as Lyrboton Kome in Pamphylia are associated with irrigated fields[55]. A similar association has been observed in the countryside of Myra in Lycia[56]. However, as the vast majority of works concerning rural settlements do not deal with the subject from this point of view, we are not able to further our knowledge of the possible relations between the inhabited area and the fields. Last, but not least, at times, there seems to be a link between threshing floors and cisterns together with pressing equipment. During the survey in Isauria, Varinlioğlu has identified a large number of threshing floors most of which exhibit a close relationship with cisterns as well as with lever and weights presses in the vicinity of rural settlements. Having considered the unnecessariness of water in the process of winnowing of grain, she suggests that the surface of the threshing floor must also have been utilized for crushing olives in particular

see Kolb, 2008, 142, 321; Rheidt, 2011, fig. 3; Erdoğan, 2019, 84, fig. 44; Aydınoğlu, 2019, 57.

48 For the agricultural zones in general see also, Harvey, 2008, 329-30.

49 Decker, 2009, 197.

50 Hirschfeld, 1997, 47-48; Decker, 2009, 197.

51 For the text see Syrcou, 1999, 222-24. See also Hickey, 2015, 74 n. 68.

52 Decker, 2009, 197.

53 Talbot, 2002, 42, 44-45.

54 For example, see Foss, 1995, 219; Foss, 1997, 199; Decker, 2009, 197.

55 Eichner, 2011, 190, 241, figs. 15, 189; Erdoğan, 2019, 23.

56 İşler, 2019b, 21.

and the cistern was present as part of the production process of olive oil, rather than only for laborers and animals working the threshing floor or for the stages of wine making that required relatively less water[57]. This suggestion may be supported by the presence of such association near Hoyran in Lycia, where a pressing installation with a cistern is located adjacent to a threshing floor[58]. A similar layout might have been adopted in Göynük Köte, although it is not explicit if the vacant area next to the cistern and the pressing installation was used as a threshing floor[59]. Although examples of this kind are not common, limited evidence at least shows that the presence of cisterns within such layout indeed seems to be primarily related to the pressing equipment. On the other hand, the practice suggested may not be feasible for those threshing floors with earthen surface. Hence, be a threshing floor endowed with a cistern and pressing equipment or not, in any case, a great deal of water must have been needed for workers and animals as well as to create a smooth rammed-earth floor before threshing, in the absence of rocky surface (**figs. 2b, 5a**).

Cisterns as a Part of the Buildings

The last matter that needs addressing is the association between cisterns and buildings, in terms of both location and function. As indicated earlier, cisterns in the most cases tend to be built close to the buildings, rather than placed in the vacant areas, as the best option is to be located near a building both to best catch the run-off water from the roof and to enable the users to make easy use of it at or around the point of use, thus preventing them having to carry water in bucket-like containers from relatively remote locations. Besides, cisterns at times are placed at a specific point in or around the building and such examples present a more detailed insight into their possible particular functions. From this point of view, cisterns may be evaluated based upon their particular reasons for their location, in the light of the most widespread surviving buildings in the rural settlements of the region including churches along with their annexes, houses, olive oil and wine workshops[60].

Having been mostly situated within the monasteries or village settlements, as well as, if rarely, in the sacred precincts or in the vicinity of rural settlements independently, rural churches differ from domestic and industrial buildings in that they required cisterns

57 Varinlioğlu, 2008a, 304-7; Varinlioğlu, 2008b, 149-51; Varinlioğlu, 2011, 185-86.

58 Kolb, 2008, fig. 361.

59 İşler, 2019a, 95, fig. 3.

60 Bathhouses are not included in this study as the examples from the Late Antique-Byzantine countryside of the region present no detailed data to provide a general approach. Some examples from the region attest to the indispensable co-existence of cisterns and bathhouses in the absence of running water, as detected in other types of buildings. See Çevik, 2000, 85; Erdoğan, 2019, 87-88 (the cistern situated near the bathhouse at Lyrboton Kome in Pamphylia). Eichner, 2011, 58, figs. 33, 36 (a possible bathhouse and the cisterns at Üçayak in Cilicia). Farrington, 1995, 108-9 (the baths fed by cisterns especially from the cities in southern Anatolia). Varinlioğlu, Kaye, Jones, Ingram and Rauh, 2017, 56 (the bath supplied by the nearby cisterns at Dana Island in Cilicia).

with relatively more sophisticated reasons. The available evidence obtained especially from the Early Byzantine countryside of the region shows the majority of cisterns are situated in the forecourt or atria which predominantly precede the church proper at the west, as well as immediately outside the main walls of the church, whilst some also have been found beneath narthexes, subsidiary spaces and sanctuaries, albeit extremely rarely. Those inside the forecourt are located at or partly off the center, as well as west of the narthex and at any available point of the space[61]. Some cisterns are known to have been built beneath narthexes[62], but this practice seems by no means common. The interior of churches likewise rather rarely includes cisterns; a number of examples have been detected in such spaces as apses, additional rooms and naves[63]. The ones outside the building are as widespread as those in the forecourt and are laid adjacent to, or a few meters from, the exterior walls of the church (**figs. 5b-5d**)[64].

Although almost no church provides any clear trace of components associated with the link between the cistern and runoff water, the location of the cisterns show in most cases they were mainly positioned very close to the roofs of the church proper and even of narthexes as well as those of the possible colonnades of the atria, in order to simply channel the water from the rooftop by means of water transfer conduits mentioned

61 For the examples that provide cisterns in the forecourt / atrium from the countryside of southern Asia Minor see Harrison, 1963, 136-37; Doğan, 2003, 192 (Alacahisar Church in Lycia). İşler, 2011, 290 (village of Asarcık East and the Monastery of Asarcık West in Lycia). Harrison, 1963, 137; İşler, 2010, 242 (Devekuyusu Church in Lycia). İşler, 2016, 386 (Günağı Church in Lycia). Grossmann and Severin, 2003, 113, 126 (the Church in Alacadağ- Güceymen Tepesi in Lycia). Aydın, 2015, 192, 196 (Church 1 and Church 4 in the village of Kanytellis in Cilicia). Hill, 1996, 15, 258 (South Church in the village settlement of Yanıkhan in Cilicia). Erdoğan, 2019, 92, 164 (North Church at Lyrboton Kome in Pamphylia). For some examples from cities and from outside the region see also, Butler, 1929, 59, 110-11, figs. III. 56, III. 112, III. 113; Tchalenko, 1953, PI. CIII, PI. CXI, PI. CXIII (Late Antique Syria). Harrison, 1963, 142; İşler, 2009, 242 (Church C and D in Andriake in Lycia). Asano, 1995, 85 (The Basilica on Karacaören Ada in Lycia). Masuda, 1995c, 112 (Mustafa Basilica near Beştaş Cove in Lycia). Scardina, 2018, 687 (Lower Church in Aperlae in Lycia).

62 Hill, 1996, 18-19, 172 (for the churches in Halil Limanı, Canbazlı and Yanıkhan in Cilicia). Harrison, 2003, 24 (the Church of St. Gabriel at Alakilise in Lycia). For the Basilica A at Kyaneai in Lycia see also, Kolb, 2008, 381.

63 Hill, 1996, 14 (Tomb Church at Corycus in Cilicia). İşler, 2009, 33 (Village of Asarcık East in Lycia). İşler, 2016, 367 (Günağı Church in Lycia). İşler, 2011, 290; Uygun-Yazıcı, 2019, 152 (Idyros Church in Lycia). Erdoğan, 2019, fig. 61 (South Church at Lyrboton Kome in Pamphylia). See also Evcim and Öztaşkın, 2019, 148 (Church 9 at Olympos in Lycia).

64 Harrison, 2003, fig. 22 (Church in Turant Dağı in Lycia). Varinlioğlu, 2008b, 71; Westphalen, 2015, 542, fig. 3 (the Church at Işıkkale in Cilicia / Isauria). Rheidt, 2011, fig. 3 (North and South Church in the Village of Akören II in Cilicia). İşler, 2016, 369 (Günağı Church in Lycia). Aydın, 2019, 534 (the Church at Seyranlık in Cilicia). Erdoğan, 2019, 92 (South Church at Lyrboton Kome in Pamphylia). See also Evcim and Öztaşkın, 2019, 143 (Church 6 at Olympos in Lycia).

above[65]. As to those situated further away from the roof, they would also have been supplied by the roof water via similar components. For instance, the cistern located 6.35 m. west of the Early Byzantine South Church of il-Anderin in Northeastern Syria was fed by roof water via a conduit extending from the northwest angle of the church[66]. On the other hand, we should keep in mind that such cisterns that are situated relatively independent of the church might have also been supplied from ground storm water, when available, as was discussed above.

Textual evidence also offers some clues as to the liturgical and symbolic use of cisterns at the churches. It is very clear that, one of the main practices associated with the water and the forecourt is related to ablution, particularly in the Early Byzantine Period, as the atria are no longer common in churches after the 6th century, except for those in monasteries. Speaking of the 4th century church at Tyre, Eusebius refers to the fountain in the middle of the atrium by means of which the people should cleanse themselves before entering the sacred precinct[67]. St. Ephraem likewise requires that one should wash their hand and mouth to take communion[68]. Paulus Silentiarius mentions the people who drew water at God's mystic feast (Epiphany) from the fountain at the center of the atrium of Hagia Sophia in Constantinople[69]. A semi legendary account from the 8th or 9th century indicates that the laity used the same fountain of Hagia Sophia for ablution[70]. John Chrysostom elaborates on the practice and the mechanisms linked to the fountains. We glean from the accounts of his diverse homilies that both the clergy and the congregation should wash their hands before proceeding further into the church. He points to an order that fountains be located probably in the forecourts of churches in order that people could wash their hands before the church service. He also writes of some water basins situated before the doors of the church for this same purpose[71]. Written sources also provide a number of references to the use of water within the covered spaces of churches. These are mainly related to the liturgy and refer to mixing wine with water and the ablution of celebrants before communion[72].

65 For a clear example see Masuda, 1995b, 80, 81 (Church IV on Gemiler Ada in Lycia). See also Evcim and Öztaşkın, 2019, 143 (Church 9 at Olympos in Lycia).For some suggestions see Nakajima, 1995, 96 (The Chapel on Karacaören Ada in Lycia). Hill, 1996, 14 (Tomb Church at Corycus in Cilicia). Grossmann and Severin, 2003, 113, 126 (the Church in Alacadağ-Güceymen Tepesi in Lycia).

66 Butler, 1929, 207, 209, fig. III. 209.

67 Euseb., *Hist. eccl.* 10.4.39-40. For the English edition of the sections see Mango, 1986, 4-5.

68 Peña, 1997, 77.

69 Paulus Silentiarius, Descr. S. Sophiae, 590. For the English edition of the section see Mango, 1986, 85. The "Phiale" mentioned by Silentiarius is fed by the running water coming through the supply lines beneath the atrium. For the plan of the supply and drainage lines of Hagia Sophia see Özkan-Aygün, 2010, 57-77.

70 *Narratio de S. Sophia*, 26. For the English edition of the section see Mango, 1986, 101.

71 For the sections of his homilies see Mayer and Allen, 2012, 220-21.

72 Tattam, 1848, 120; Peña, 1997, 77; Acara, 1998, 189; Loosley, 2012, 79.

We may then, make some suggestions about the functions of the cisterns situated within and around the rural churches in the region, based upon the literary evidence and some additional archaeological data. Fountains located at the center of atria are known from a few Early Byzantine churches[73], whilst this feature is not at all widespread. A number of rural churches from the countryside of Lycia indicate that the cisterns in the middle of forecourts have to some extent replaced fountains, although not as a rule (**fig. 5d**)[74]. In any case, the frequent use of cisterns at any point of the forecourts of the churches in the region seems to indicate one of the traditional functions, that is, ablution. Water stoups (*kolymbion* / *benitier*) which are believed to contain holy water and placed mostly in the east wall of the narthexes of some Early Byzantine rural churches in Cilicia[75] should be associated with this practice. As mentioned before, the presence of cisterns in narthexes is very limited, for both the cities and countryside of the region. Although the cisterns situated beneath some narthexes of Early Byzantine Churches in Cilicia were associated with possible baptisteries surmounting them[76], this is probably not the case, since it was by no means common to place baptisteries in the narthex, or in the forecourt, within the boundaries of the region in question[77]. With regard to the cisterns inside the church, they are extremely rare and when present, they are at times connected with an earlier structure or a later addition, as seen for example in the village of Asarcık East and Lyrboton Kome[78]. On the other hand, some instances may indicate contemporary usage as well. Thus, the cistern beneath the apse of the Tomb Church at Corycus was identified with the baptistery functioned as the southern side chamber from the discovery of the fragments of a water conduit[79]. In very rare cases, wells were used in the interior of the churches, especially at the bema, and have suggested associations with the function of *thalassadia*[80]. Several possible links between the cisterns situated outside the churches and the baptisteries were also identified. There is a cistern immediately east of the Early

73 Johnson, 1991, 228; Jacobs, 2013, 360-61.

74 See n. 61. See also, Doğan, 2003, 187.

75 For Cilicia see Hellenkemper and Hild, 1986, 65, 84; Hellenkemper and Hild, 1990, 159, 169, 440, 459; Hill, 1996, 18; Aydın, 2012, 417-18; Mimaroğlu and Aydınoğlu, 2017, 129. For Syria see Butler, 1919, 93, 98, 139, 180, 181; Butler, 1929, 216, 217, figs. III. 218-20; Lassus, 1947, 194; Key-Fowden, 1995, 91.

76 Hill, 1996, 19.

77 No baptisteries have been identified neither in the narthexes nor in the atria of the churches in the region in question. See Uygun-Yazıcı, 2019, 274.

78 For Asarcık East see İşler, 2009, 33. For Lyrboton Kome see Erdoğan, 2019, 150.

79 Hill, 1996, 14. For the Idyros Church in Lycia see also, Uygun-Yazıcı, 2019, 152. A cistern was identified beneath the so called *bema* (ambo of some kind) located in the nave of the Early Byzantine Church at Kafar Nabo in northern Syria. Although its specific function is uncertain since it is an exceptional example amongst the *bema* churches (see Tchalenko, 1990, 264; Loosley, 2012, 153, fig. 42), One may suggest that the cistern is associated with the needs inside churches mentioned above and below.

80 In general, see Öztaşkın, 2020, 303-9.

Byzantine Church situated southwest of the Late Antique Farmstead in the Village of Seyranlık in Cilicia. The closeness of the cistern to the baptistery used as the northern side chamber and the presence of the traces of a water conduit inside it[81], suggest an association of this type. A similar connection might have been established between the cistern outside the apse and the baptistery located adjacent to the south of the apse of the Church at Turant Dağı in Lycia (**fig. 5b**)[82].

Judging by the remains and the literary evidence, it is safe to say that, in the process of planning the location, people primarily tended to construct cisterns in the open spaces and close to the roofs of the churches, rather than placing them at the exact point of use, in order to both ensure easy maintenance, such as renewing the plaster or cleaning the accumulated dirt, and to catch the roof water from the nearest point. Perhaps this explains why most of the covered spaces of churches include no cisterns. On the other hand, almost every church contained one or more cisterns which made it possible for water to be carried to the nearby point of use with conduits or containers. Therefore, no matter at what point the water was required, all manner of needs associated with water such as baptism, ablution, washing liturgical objects, epiphany, preparing the mixture of wine and even with the daily requirements of the clergy and in the presence of accommodation, must have been in any case simply provided for.

Houses are the nucleus of both households and rural settlements. Therefore, people had to ensure a reliable water supply, near to or within the limits of their houses, in the event of circumstances that might not enable households to reach other or more distant water sources. But more importantly, the bulk of the daily and periodic routines, in most cases associated with the houses, and in particular with the yards, necessitated a large amount of water. Amongst them: cooking, washing of clothing, bathing, cleaning, toilet-linked requirements, processing of such products as olives, grapes and grains, handicrafts, slaking the thirst of the members of the household and watering their animals, small scale garden irrigation and so on, most of which are suggested or attested to have been the case for Late Antique-Byzantine rural houses. Therefore, it is not surprising that of all the types of buildings in the rural settlements, it is the house by far that uses cisterns the most.

Almost every house in the countryside of the region had one or several cisterns. The bulk of the examples are situated in the yard[83], as was the case for churches. The

81 For the church see Aydın, 2019, 522, 525, 534.

82 For the plan of the church see Harrison, 2003, fig. 22. Similar association may be discerned at Işıkkale (Westphalen, 2015, 542, fig. 3) and at the Church at Belören in Lycia (İşler, 2019b, 25, fig. 13). For the baptistery of the Church I on Gemiler Ada in Lycia see Masuda, 1995a, 57, 59. For the baptistery of the Basilica on Karacaören Ada in Lycia see also Asano, 1995, 86.

83 For the examples see Harrison, 2003, 21 (Alakilise in Lycia). Akyürek, 2008, 303 (Palamutdüzü in Pamphylia). Ceylan, 2009, 52, 53; Aydınoğlu, 2015, 19, fig. 9a (Kanytellis in Cilicia). Aydınoğlu, 2010, 248, 251; Aydınoğlu and Çakmak, 2011, 84; Aydınoğlu, 2013, 84 (Roman-Late Antique rural houses in Cilicia, as a common characteristic). Eichner, 2011, 121 (Çatıören in Cilicia). Mimaroğlu and Aydınoğlu, 2017, 124 (Öküzlü in Cilicia). Aydınoğlu, 2017, 295, 297 (Paslı and Demircili in Cilicia / Isauria). Erdoğan, 2019, 82 (Lyrboton Kome in Pamphylia). For

second most commonly preferred location is immediately adjacent to or outside the main wall of the house[84]. Some water cisterns have also been found inside rooms on the ground floor, but very exceptional[85]. There is relatively more evidence concerning the water supply system established between the cisterns and the roofs of the houses, especially in the countryside of Cilicia, by comparison with the churches. On the other hand, a couple of examples from the region demonstrate that the method employed is alike. Cisterns are likewise in most cases fed from the roof of the house, whether they are located inside the rooms or in the open spaces, as may be discerned from their location and from the traces of water conveying components. Some examples from rural houses in Cilicia have shown the roof water was discharged into the cisterns by means of conduits attached along the wall of the houses (**figs. 3g-3h, 6a-6b, 7a**)[86]. Since peristyle houses are rather scarce in the countryside of the region, the existence of a *compluvium*-like system that drains rainwater into a cistern should be very exceptional[87].

The production of olive oil and wine as well as their trade were one of the main livelihoods for the inhabitants in the countryside of southern Anatolia during late antiquity and partly in the Byzantine period. Archaeological evidence for this activity is found in many rural settlements, the remains of ateliers and of various equipment for pressing, crushing etc. Written sources and recent practice point to the necessity of using water in certain processes of olive oil production in particular. Unlike wine-making[88], water was very instrumental in several stages of olive oil production, depending on the methods employed. Following the crushing of olives, a certain amount of water was poured to

those from outside the countryside of the region see also Rheidt, 1990, 199, 202, fig. 10; Rheidt, 1996, 227, fig. 7; Türkoğlu, 2004, 118 (for some examples from the Middle and Late Byzantine houses in Pergamon). Hirschfeld, 1997, 61 n. 105 (Negev).

84 Tiryaki, 2003, 132 (Karakabaklı in Cilicia / Isauria). Aydınoğlu, 2010, 251 (Roman-Late Antique rural houses in Cilicia, in general). Eichner, 2011, 58 (Üçayak in Cilicia). Aydınoğlu, 2017, 293, 295, 297 (Karaböcülü and Demircili / Imbrigion Kome in Cilicia). İşler, 2019a, fig. 3 (Göynük Köte in Lycia). Erdoğan, 2019, 82, 85 (Lyrboton Kome in Pamphylia).

85 Tiryaki, 2003, 125, 129; Aydınoğlu and Çakmak, 2011, 73; Aydınoğlu, 2017, 296, fig. 31 (Karakabaklı). Eichner, 2011, 44 n. 351, 166, 224, 262, 288, 460 n. 1890, 460-61, figs. 155, 227, 261, 283 (for the examples from some rural houses at Karakabaklı, Yapısıgüzel, Cennet-Cehennem, Işıkkale and Sinekkale in Cilicia / Isauria). Kato and Taki, 2010, 138-39 (for some houses on Gemiler Island Area in Lycia). For those from outside the countryside of the region see also Sigalos, 2003, 214 (For the examples from Medieval Greece). Türkoğlu, 2004, 118 (for some examples from Middle and Late Byzantine houses in Pergamon).

86 Eichner, 2011, 34, 58, 227, 294, 413, figs. 227, 283, 290, 395 (For Üçayak, Karakabaklı and Sinekkale in rural Cilicia / Isauria); Aydınoğlu, 2019, 57 (For Üçayak and Karadeveli in Cilicia). For some houses on Gemiler Island Area in Lycia see also Kato and Taki, 2010, 137-39.

87 For a discussion on the Peristyle House at Karakabaklı in Cilicia / Isauria see Eichner, 2011, 227-28.

88 Water usage was an exceptional case for wine making. It was used after the second pressing depending on the preference. See also Frankel, 1999, 42.

soften the first pulp and thereby to make possible to some extent the oil extraction. During the process of pressing the olive pulp, which may be performed several times, hot water was added for the extraction of oil. After this stage, hot water could be utilized to clean the baskets used during the pressing. Water would be also used to help the separation of the olive oil from the resulting liquid that flows into the collecting vat[89]. Water must have been required for cleaning the workshop from residues[90] and to supply the daily needs of the workers. According to a completely different method, olives are also known to have been boiled in water and then the floating oil is bailed off[91], although this process cannot be associated directly with workshops.

The indispensable relationship between water and workshops, especially those for olive oil making, can be distinguished through the archaeological remains. Countless olive oil and wine workshops were identified in the countryside of southern Anatolia, located on the ground floor or in the yards of houses as well as independent of any buildings. Those situated attached to the houses could simply supply their water, because majority of the houses already had their own cisterns. This is probably the case for the workshops located near to houses or close to the independent cisterns in the vacant spaces. On the other hand, many workshops or pressing equipment are situated away from such cluster of buildings and only a minority of them contains cisterns (**fig. 7b**)[92]. Hence, the people who once worked in such workshops, in most cases must have had to carry the water required from relatively greater distances or from nearby water sources, if any.

Conclusion

Despite being one of the most modest elements of rural settlements, cisterns have always been the most critical of structures amongst the various kinds of buildings concerning habitation. On examination, this study presents sufficient data, archaeological, and epigraphic, and literary evidence to comprehend the multi-functional and at times sophisticated characteristics of cisterns in the territory of southern Anatolia. Almost without exception, every rural settlement had cisterns, whilst such water supply structures as water wells or channels, together with water bridges are quite sparse and thereby, the inhabitants had rather to rely upon the collection of rainwater. They are in most cases unadorned, without inscriptions, rock-cut, circular in shape, and were covered

89 Varinlioğlu, 2011, 180, 185. See also, Curtis, 2001, 311, 313.

90 See also, Çevik, 2000, 88; Aydınoğlu, 2009, 19.

91 Frankel, 1999, 47.

92 For some independent workshops that contain cisterns see Aydınoğlu, 2009, 56 (Settlement of Hayatınbaşı at Ovacıkalanı in Cilicia; for wine production); Aşkın, 2010, 37 n. 5, 41 n. 31 (Korykos in Cilicia); İşler, 2014, 697, 707, 711 (a farmstead-like settlement at Karabel in Lycia, for wine production. Also, see for the territory of Myra); Aydınoğlu, 2019, 58 (Rural settlements in Rough Cilicia, for wine and olive oil production, in general); Erdoğan, 2019, 84-85 (Lyrboton Kome in Pamphylia, for olive oil production). See also Hirschfeld, 1997, 63 n. 117 (at Zur Natan / Horvat Migdal, a frequently attested "combination of a winepress, an oil press, a water cistern").

with a wooden or stone lid. Those rectangular in plan and covered by vaults exist as well, relatively less in number, except for Cilicia. The average capacity of these cisterns generally ranges from 20 to 50 cubic meters. Only minority of them could hold hundreds of cubic meters.

There are basically two essential reasons for locating cisterns at any point of the vacant areas or of buildings, both of which concern proximity to the point of use and to the supply of quantities of rainwater. Whether associated with buildings or not, in the vast majority of examples the cisterns were found in open spaces, that is, in courts, near to or attached to the exterior walls or situated in the vacant areas. Those supplied with roof water via conduits constitute by far the majority of examples amongst the rainwater supply systems. Plenty of cisterns fed by storm water running along the ground surface by means of incised channels have also been identified. Cisterns have made direct contributions to various daily or periodic routines and requirements, depending upon the types of buildings, be it connected with production, agriculture, religious practices or the basic needs of the population. The relation between such activities and cisterns have been proved in many cases through textual and archaeological evidence as discussed above. Among them are processing of products such as olives, grapes and grains; cooking, the washing of clothing and of various materials, bathing, personal cleaning, handicrafts, drinking water for households and their animals; for the irrigation of gardens and fields; providing water for ablution, for the baptistery, for washing liturgical objects, amongst a multiplicity of uses of cistern water.

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FIGS

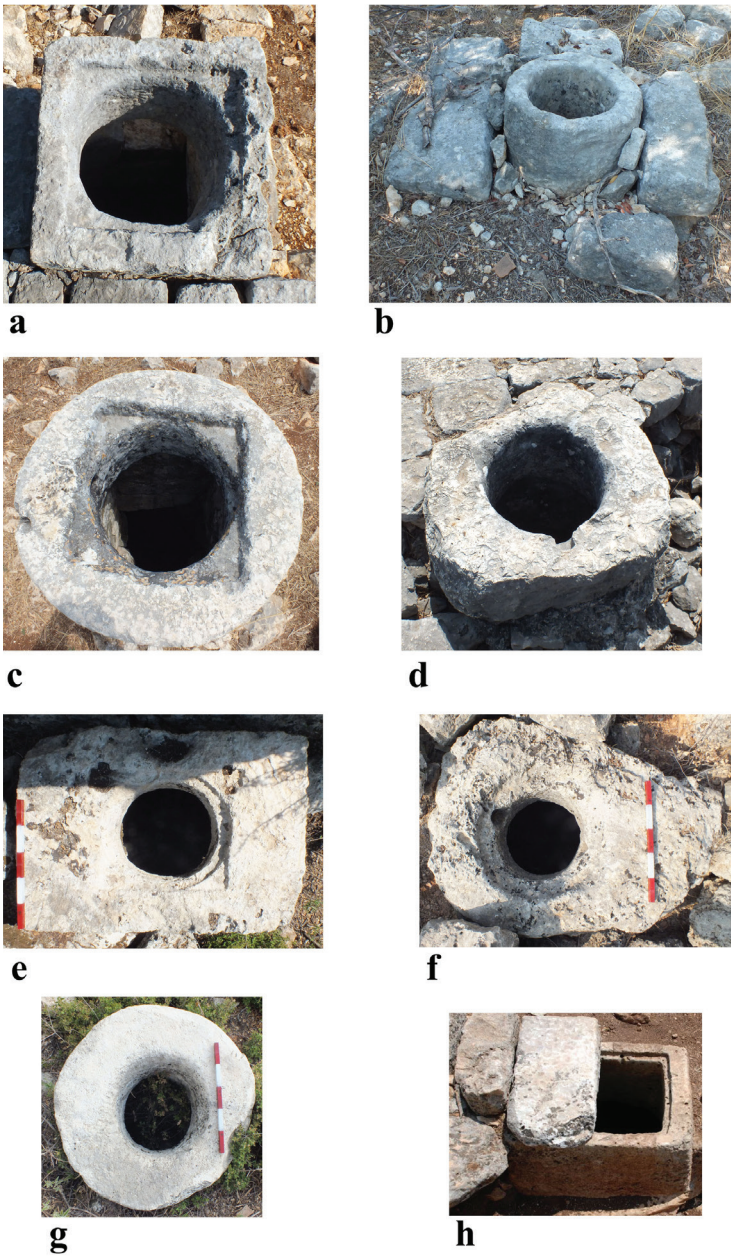


Fig. 1: Cistern heads. **a-b▸** Işıkkale in Cilicia / Isauria (Photo: by the author, courtesy of Ü. Aydınoğlu). **c-d▸** Kanytellis in Cilicia (Photo: by the author, courtesy of Ü. Aydınoğlu). **e-g▸** Lyrboton Kome in Pamphylia (Photo: by the author). **h▸** Günağı in Lycia (İşler 2019b, fig. 8).

Fig. 2: Cisterns covered by a vault and rectangular in plan. **a›** Inside of the cistern located to the south of the house at Üçayak in Cilicia (Photo: by the author, courtesy of Ü. Aydınoğlu). **b›** The cistern located near to the threshing floors in Işıkkale (Photo: by the author, courtesy of Ü. Aydınoğlu). **c›** Işıkkale (Photo: by the author, courtesy of Ü. Aydınoğlu). **d-f›** The cisterns situated at the open spaces of Kanytellis (Photo: by the author, courtesy of Ü. Aydınoğlu). **g›** A barrel vaulted cistern with compartment in Lyrboton Kome (Photo: by the author). **h›** The cistern supplying water for the bathhouse in Lyrboton Kome (Photo: by the author).

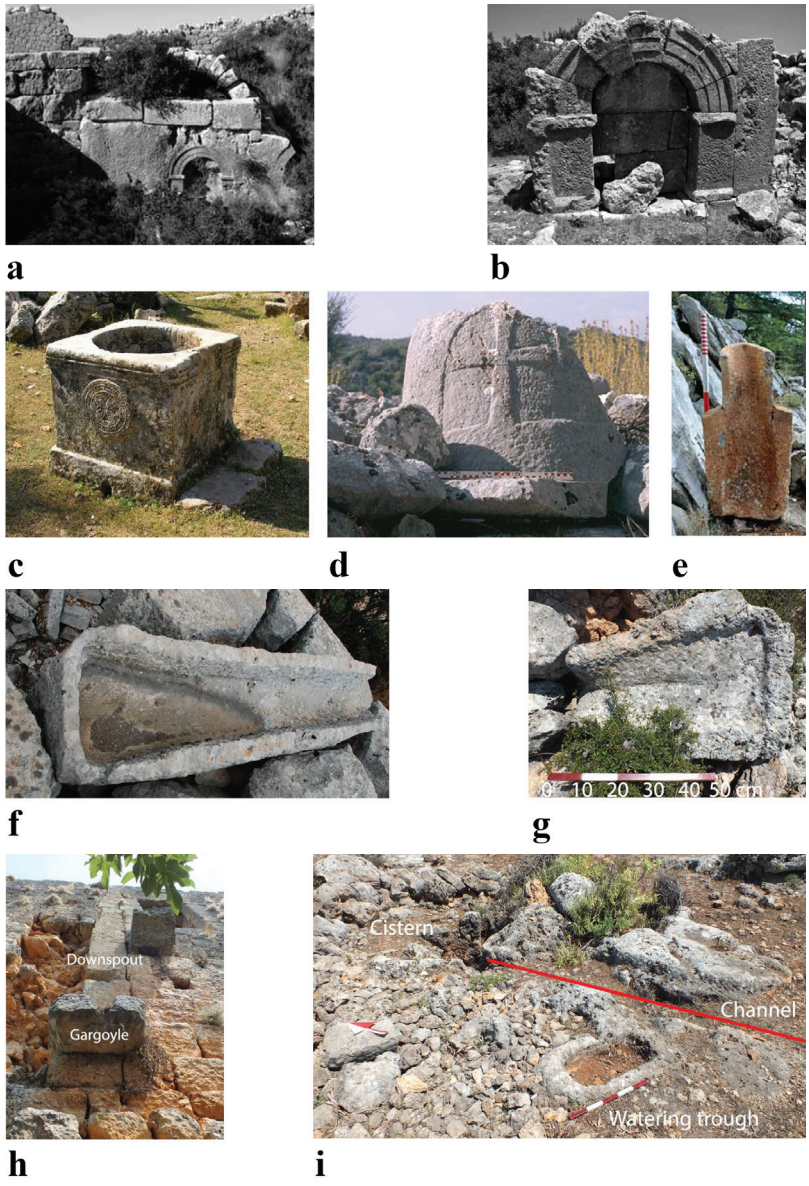
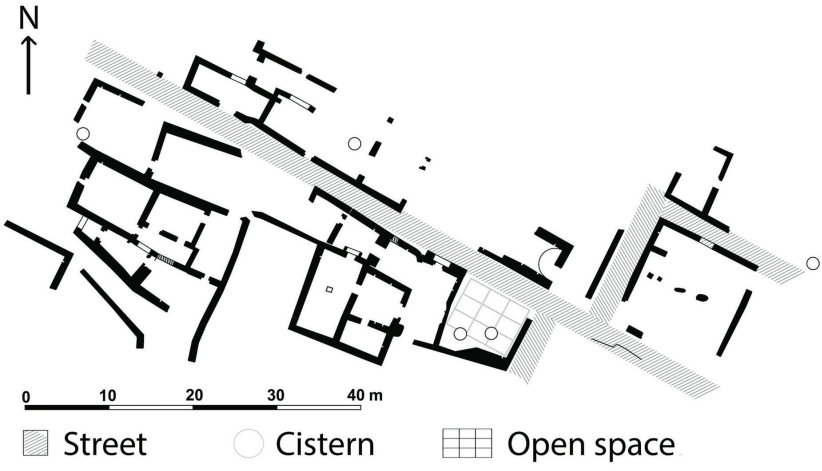


Fig. 3: a-b› Cisterns with arched niche at Paslı in Cilicia / Isauria (Aydınoğlu 2013, figs. 19, 23). **c›** A cistern head with cross relief in Alakilise in Lycia (İşler 2019b, fig. 22). **d›** A cistern head with cross relief and inscription at Buzağlık in Lycia (Yener-Marksteiner 2015, fig. 19). **e-g›** Gargoyles. **e›** Mnara, Bey Mountains (Kizgut and Akalın 2010, fig. 5). **f›** Asarcık West, Lycia, on the roof of the church (İşler 2019, 191). **g›** Lyrboton Kome, in the debris of a house (Photo: by the author). **h›** Downspout and gargoyle attached to the south wall of the house at Üçayak to discharge the roof water into the cistern (Photo: by the author). **i›** Lyrboton Kome, detail (Photo: by the author).



a

b

Fig. 4: Open spaces containing cisterns. **a›** Lyrboton Kome, western part of the village. **b›** Işıkkale (Photo: by the author, courtesy of Ü. Aydınoğlu).

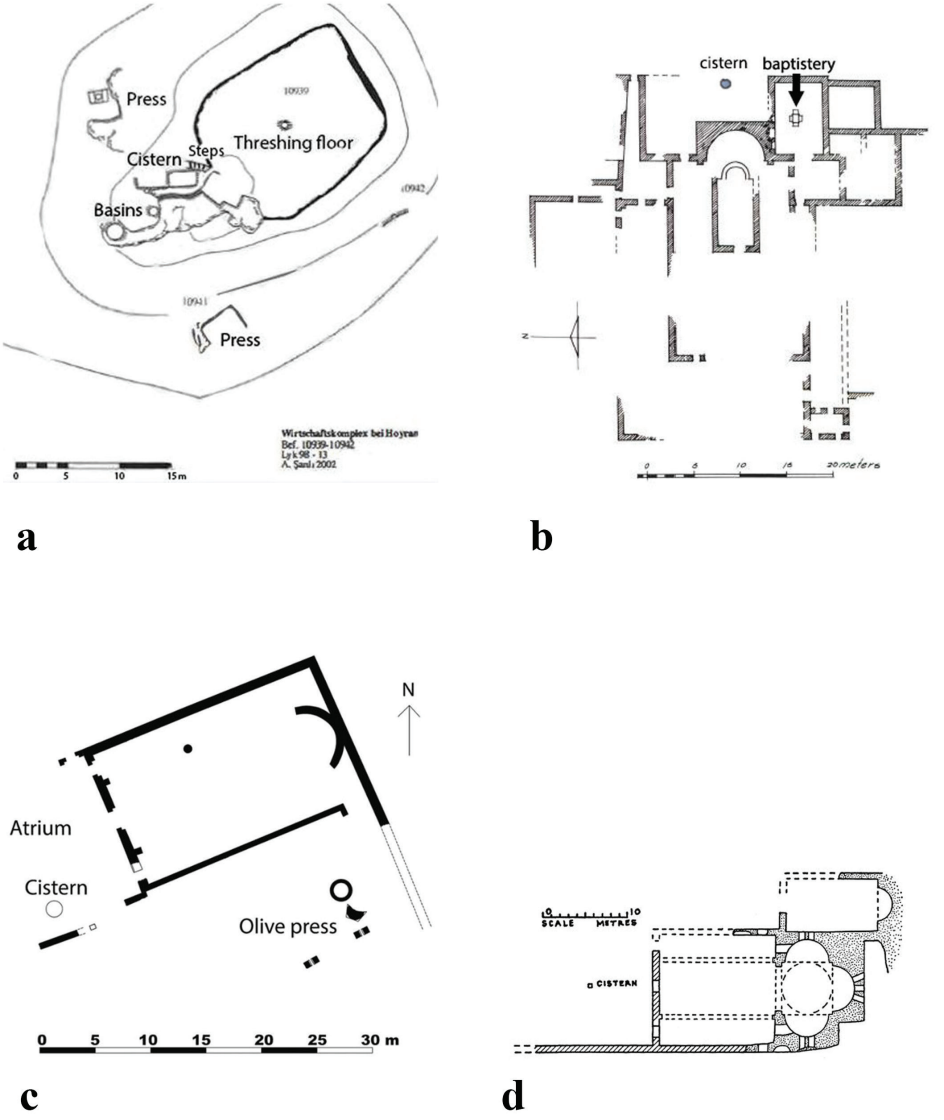
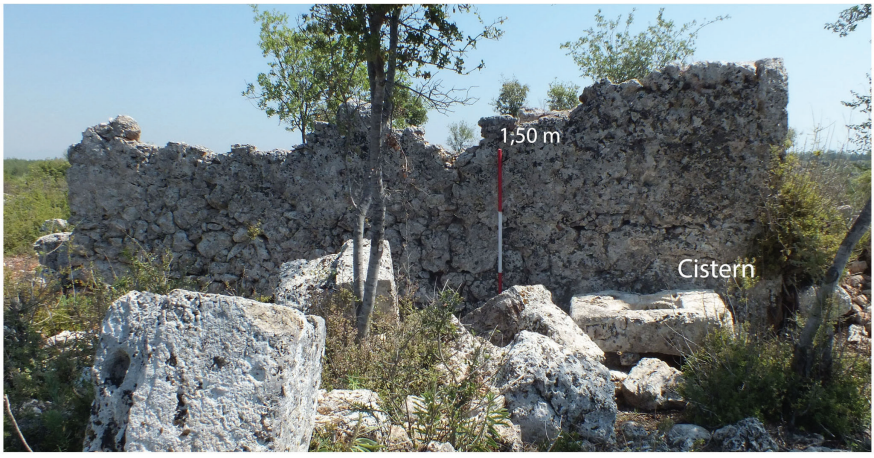


Fig. 5: a› Combination of a threshing floor, a cistern and presses at Hoyran in Lycia, modified (Kolb 2008, fig. 361). **b-d›** location of cisterns at some churches. **b›** Turant Dağı in Lycia (Harrison 2003, fig. 22). **c›** Lyrboton Kome, North Church (Photo: by the author). **d›** Alacahisar in Lycia (Harrison 2003, fig. 28).

a

b

Fig. 6: Cisterns situated outside the main walls of the houses. **a›** Üçayak (Photo: by the author, courtesy of Ü. Aydınoğlu). **b›** Karakabaklı in Cilicia / Isauria (Photo: by the author, courtesy of Ü. Aydınoğlu).



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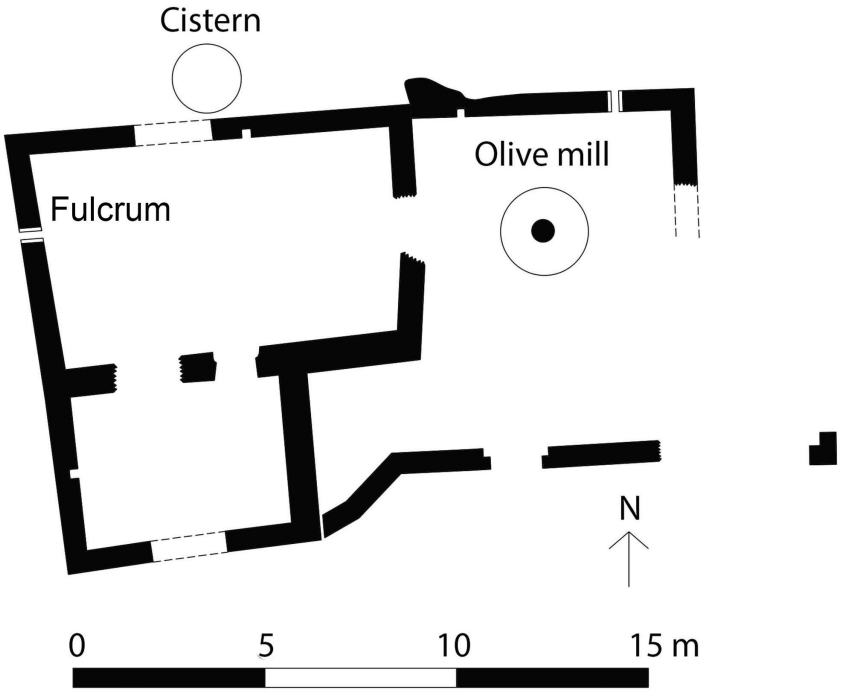

b

Fig. 7: a› The cistern attached to a house at Lyrboton Kome (Photo: by the author). **b›** A cistern located adjacent to the main wall of an olive oil workshop in Lyrboton Kome (Photo: by the author).

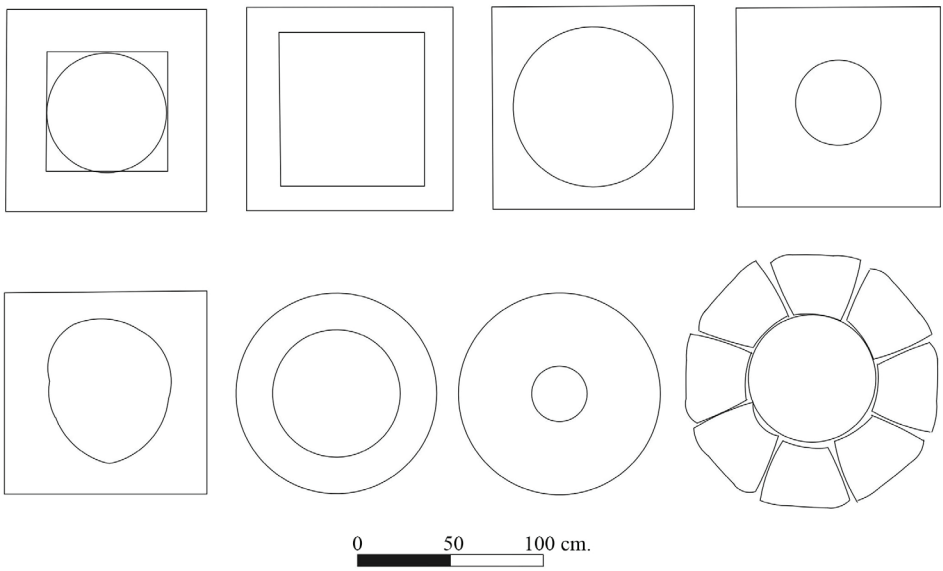

Fig. 8: a› The most common types of the cistern heads in the territory. **b›** Typical forms of the cistern sections in the territory.

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