

## Southern Mesopotamia: Water and the Rise of Urbanism

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### **Abstract**

The region of southern Mesopotamia, in modern southern Iraq, was home to perhaps the world's oldest cities and complex societies. Such cities and towns developed closely to irrigation works and other water features, with major settlements developed along levees and so-called 'turtle backs' made up of natural accumulation and human-made debris. While water was a critical component to the rise of cities, it was also the unique evolution of societies to their complex landscape, including the development of different social practices, that made the region develop early cities. By-products of these social developments included religious institutions and inequality but also the rise of governments, written language, laws, and other forms of social development we associate with our own societies. Recent work in southern Iraq demonstrates that the region was likely occupied much earlier than we thought; new climate data and other work will mean our picture on how the environment shaped the development of urban-based societies in southern Mesopotamia will evolve in the coming years. New fieldwork, including surveys and excavations, will also shape a new understanding of how urbanism arose in this complex landscape.

*Keywords:* irrigation, settlement, Southern Mesopotamia, channels, Uruk, urban

### **Introduction**

The region of southern Mesopotamia, what is southern Iraq today, has been seen by scholars as perhaps one of the earliest if not the earliest place in which urbanism began (Rothman, 2004; Adams 1981). The region was home to early urban settlements such as Uruk, Girsu, Kish, and others that created some of the first governments, writing, standing armies, laws, and various other cultural features we regard as part of our own societies. Intimately tied to the history of the region is its history of complex water systems that consisted of natural and human-made channels, irrigation works, swamps, and levees (Wilkinson, 2013; Figure 1). The complex region of southern Mesopotamia can be regarded as a type of hydraulic landscape of natural and human-made features that led to the evolution of societies to form a close relationship with different hydraulic works and not just irrigation. These features were also volatile, prone to change as the environment and hydrology shifted. The rise of early cities can only be understood as an evolution of not only the natural setting but the needed social change that enabled cities to be a by-product of this change and one that saw investment by early societies to make what would become large settlements resilient in the face of sometimes rapid environmental change. Nevertheless, the history of how water systems functioned and evolved in southern Mesopotamia is still unclear and represents an active research area. As water systems and their development are intimately tied to the rise of social complexity in southern Mesopotamia, the gaps in our knowledge means there is still a lot we do not know about the region and why it became an area so important to the rise of urbanism and complex societies. Answering this has relevance to our own societies, as the urbanism that arose in southern Mesopotamia had an impact to our own way of life.

### **The Ubaid Period and Prehistory of Southern Mesopotamia**

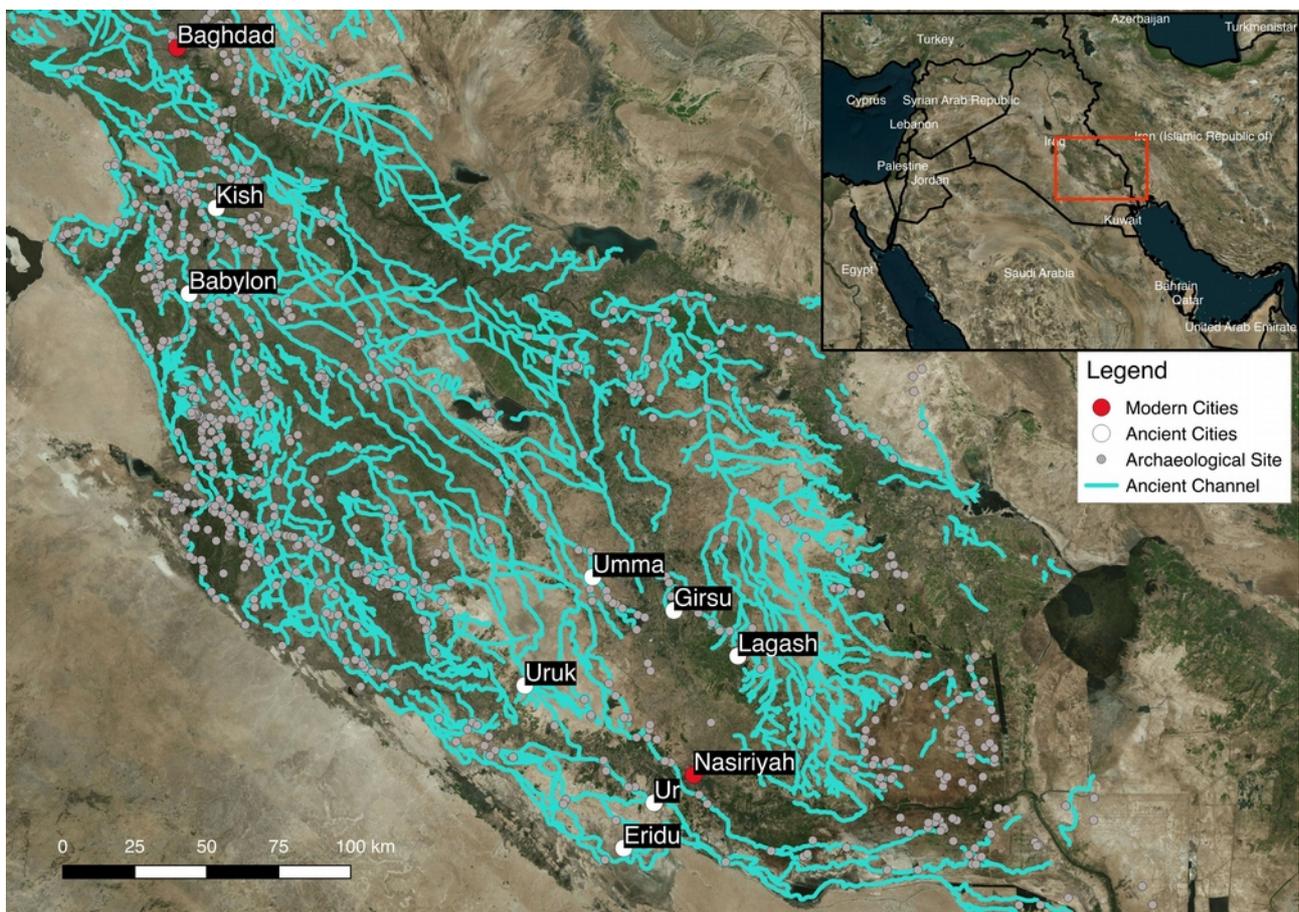
We do not know when the region of southern Iraq was first occupied. Sometime by the early Holocene, perhaps at the beginning of the Holocene, southern Iraq began to be exposed as dry land as eustatic and isostatic changes to the Persian Gulf meant the region began to become habitable. Early cultures that occupied the region at this time are unknown to us but are likely present between 10,000-8000 BCE (Altaweel et al., In Press). In the delta regions of southern Iraq, exposed, mounded areas, called 'turtle backs,' surrounded by freshwater marshlands became areas of habitation that over time, and through the accumulation of anthropogenic and natural debris and sediment, led to what would become the long-lived cities and settlements of southern Mesopotamia (Pournelle, 2003). These areas became exposed through the building of dams and dykes that allowed dry areas to be built-up, similar to southern, delta marshlands in parts of southern Iraq today, where early societies also exploited the rich environment of waterfowl, fish, and different animal life found in the region.

Sometime by around 6500 BCE, the culture of the Ubaid began to appear throughout the region, with settlements expanding across the alluvial plain. Surveys across much of southern Iraq have shown the extent of not only where the Ubaid began to appear but also the change in settlement patterns across time in southern Mesopotamia (Adams, 1965; Gibson, 1972; Wright, 1981; Adams, 1981). The Ubaid culture began to already create irrigation works and likely exploited the rich environment of natural marshlands. The river systems consisted of the Tigris and Euphrates, with multiple branches and possibly other rivers that likely formed the river systems that allowed varied regions to be conducive for long-term agriculture. Anastomosing, multiple channels, with channels vulnerable to movement, meant that river avulsion was a prominent feature of the landscape. Permanent settlement in southern Mesopotamia may have been difficult as channels may have frequently moved. Settlements had to sometimes alter natural channels or create new channels to make a given place more resilient to channel shifts.

It is unclear how water systems were developed in conjunction with the natural environment in the Ubaid period. Very likely, this period was wetter than today, with the Tigris and Euphrates forming a multi-channel river system that enabled or facilitated irrigation (Altaweel et al., In Press). Over time, levees would form as sediments deposited through natural flooding or irrigation would build banks along the course of longer-lived canals. Similar to the turtle backs, these also became ideal areas for settlement to form, as they could avoid flooding from irrigation works and rivers, while accessing the fields that would be irrigated in the alluvial floodplain. Already in the Ubaid there might be evidence of social adaptation to the type of landscape found in southern Mesopotamia, as the development of religious architecture suggests beliefs played an important role to the identity of places and emerging settlements. Temples and early religious institutions put a great emphasis on the importance of given places, meaning that societies invested time and effort in giving settlements and access to water through continual effort in maintaining channels and channel access for cities. Comparatively, societies in India have similarly shown that religious institutions help societies to invest and bind communities to given spaces that encourages further investment in infrastructure such as canals, temples, and cities themselves (Shaw, 2013). This is potentially seen at Eridu, an early settlement with a long-lived pattern of successive temple plans that may suggest efforts to keep communities committed to the place through religious and social investment (Safar et al., 1981). Interestingly, the patron god of Eridu is *Ea* (in Akkadian) or *Enki* (in Sumerian), who is the god of water and knowledge. The importance of water to these early settlements, including their continuity, is perhaps symbolised by this god. Although cities such as Eridu are abandoned, the fact they begin to show centuries long occupation indicates likely engineered landscapes through greater irrigation and channel creation that began to emerge to sustain settlements. Settlements were shown by Adams (1965; 1981) to have been established along different water channels that likely were a combination of natural and human-constructed channels, demonstrating early dependence on irrigation and channels for transport. Recent work by Jotheri (2016) has mapped many more

channels that had not been previously known, while other work (Hritz, 2010; Hritz & Wilkinson, 2006) has demonstrated how subtle changes in elevation influenced the placement of settlements along levees.

As the Persian Gulf continued to recede, the landscape transformed in places to alluvial plains that were relatively more stable for settlement and conducive for long-term agriculture, although volatile environmental change was always a possibility in southern Mesopotamia. By 4500 BCE, settlements from the Ubaid culture dotted much of southern Mesopotamia and even expanded outwards towards the Persian Gulf, Iran, Anatolia, Syria, and ventured to areas far south in Arabia along the Persian Gulf or possibly even beyond. Southern Mesopotamia was devoid of stones and wood likely became a premium commodity, perhaps fuelling some of these early expansions by enterprising individuals and communities (Carter & Philip, 2010). The Ubaid period came to a close sometime around 4000 BCE. Already by then, settlements grew larger, over tens of hectares in places. Problems settlements may have faced included siltation of channels as well as salinization (Jacobsen & Adams, 1958). However, evidence to the extent that settlements faced such difficulties has not been conclusively demonstrated in fieldwork. Nevertheless, if we use examples from modern and more recent times, such environmental change could have posed as problems for long-lived settlement in southern Iraq.



**Figure 1.** Map of southern Iraq, showing ancient sites and channels along with major ancient cities. Channel data and sites (courtesy of Jaafar Jotheri and Carrie Hritz; based on Jotheri, 2016; Adams, 1981; Wright, 1981).

### The Uruk Phenomenon and Urbanism

With renewed work in southern Iraq today, the picture on the rise of urbanism will very likely change. Part of the problem is we do not have a large number of radiocarbon dates from southern

Mesopotamia, making the exact timing of urbanism unclear. Nevertheless, by the 4<sup>th</sup> millennium BCE, perhaps around 3500-3200 BCE, the site of Uruk began to greatly expand to more than 100 hectares (Finkbeiner, 1991). By this point, we can call such a settlement a true city, where the site of Uruk had developed a religious precinct, with multiple temples, including those dedicated to the sky god *An* and love and war goddess *Inanna* (Liverani et al., 2006). Writing appears in the temple precinct by the late 4<sup>th</sup> millennium BCE, indicating that recording of goods coming to the temples, which formed important or even dominant land owners and economic engines for the city. Temples helped the economy but likely also facilitated the rise of social inequality, as they increasingly grew larger particularly during the 4<sup>th</sup> millennium BCE (Thomas, 2012). Effectively, writing is invented as an accounting device, recording sometimes mundane facts such as the number of animals and grain (Nissen, 1986). The 4<sup>th</sup> millennium BCE generally saw rapid social change that included faster production of wheelmade pottery, new forms of artwork, sophisticated administration, that, in addition to writing, included cylinder seals (Rothman, 2004; Algaze, 2001). Canals or even canalized channels appear inside of such early cities. This not only enabled irrigation, but transport was facilitated by the presence of these water systems that facilitated movement of goods and people between early towns and cities. Very likely, canals also played a role in facilitating some of the inequality evident in early cities, as goods can be more easily accumulated by cities such as Uruk.

These changes reflect increased urban complexity, that is an urbanized system, that began to have increasing natural and social system interactions, which developed to also become expansive. Similar to the Ubaid period, the Uruk culture, at least in different times, sought to expand its cultural reach and establish colonies or perhaps even conduct military expansion in places (Algaze, 2008). Regardless, the resource hungry towns of southern Mesopotamia also meant that irrigation and waterworks became larger or even more sophisticated. Field systems and their control were critical to an agricultural-based economy. In the 25<sup>th</sup> century BCE, history's first recorded water conflict, between the cities and states of Lagash and Umma, revolved around a dispute related to different areas that also included irrigated lands and canals the states used (Rey, 2016; Foster, 1984). Perhaps such conflicts already had their origin by the 4<sup>th</sup> millennium BCE, as towns and population grew. This conflict shows how water had shaped the economy and politics of the region such that controlling key canals had become tantamount to controlling the import highways and water sources that enabled a city to thrive.

While these results would suggest that a central state is a likely result when irrigation and large-scale agricultural systems develop whereby there is a great dependence of irrigation, this might not be the case. Small-scale collaboration between groups and locally managed systems are evident even in historical periods, in such cases local clan lineages often formed a key component of managing irrigation, even as management of water and irrigation required complex agreements and cooperation (Nieuwenhuis, 1982: 154). This suggests that complex irrigation systems did not require a top-down state structure but locally managed, collaborative networks could create a large and efficient system of irrigation works. At times, urban governments could intervene or sponsor major irrigation works, creating a type of mixed local and top-down system (Rost, 2017). The system of crevasse splays that formed much of the riverine context of southern Mesopotamia helped create a system of narrow fields in a herringbone-like pattern (Wilkinson et al., 2015). Organic, natural cooperation and government interaction in such as landscape could create systems that could help sustain, over long periods, large urban centres such as Uruk, Lagash, and others that were evident by the 4<sup>th</sup> and 3<sup>rd</sup> millennium BC. Already by the Ubaid, we had seen that long-lived temples helped to create the social structure needed to bind people to their land and settlements. This evident example of niche construction demonstrates how populations adapted to the local ecology and environmental setting, but it was not necessarily irrigation that caused the direct rise of complex, urban-based governments. It could have been one product of irrigation but other factors have to be considered, including trade and conflict over resources that facilitated urban rise.

## **Water and Cities in Southern Mesopotamia**

Water plays an important role in the rise of urbanism, not only because it can be used for direct human consumption and irrigation of crops but because water systems also provide low friction transport that makes the movement of goods needed to supply cities much easier. This is the likely case for southern Mesopotamia, a region that is flat and the presence of multiple, anastomosing channels conducive for irrigation made urbanism thrive as goods could be moved using the network of canals and channels. This, despite the volatility of the river systems themselves, including avulsion, siltation, and salinization as possible threats to habitation. Social structures that emerged meant that people began to invest in cities so that avulsion or channel change could be minimized, to an extent, as a threat to cities. The importance of temples cannot be understated, where providing for the gods meant that your city could thrive (Van de Mieroop, 2004). Temples helped to keep interest focused on cities so that renewed investments by the rulers and population through their labour facilitated urban continuity even in the face of sometimes threatening environmental change. One by-product of this could have been the rise of social inequality, even as cities became more resilient.

Over time, the political centres shifted to the northern part of the alluvial plain in southern Mesopotamia, where the Euphrates and Tigris are generally more stable. In that part of the plain, both rivers are near each other and the rivers have not shifted as greatly from their ancient courses. This weakened cities such as Uruk, which was in a relatively more vulnerable position to the south and the city gradually diminished in influence but was not finally abandoned until the 1<sup>st</sup> millennium CE, when monotheistic faiths had diminished the importance of the ancient gods and their temples. What is remarkable is how resilient cities were in southern Mesopotamia, with only limited periods of major abandonments in the 2<sup>nd</sup> millennium BCE evident in many places. The combination of religious beliefs, engineered landscapes, and a likely mixed state and organic system of management helped cities to thrive in what otherwise would have been a difficult landscape for long-lived settlements (Jotheri et al., 2017).

## **Conclusion**

Societies in southern Mesopotamia evolved along with their environmental surroundings, creating irrigated fields that build from natural crevasse splays evident in the landscape. The use and application of irrigation evolved over millennia even before the rise and development of the first cities in southern Mesopotamia. Water was at the heart of cities' ability to thrive, as demonstrated by the conflict between Umma and Lagash. There is still much we do not know about how water shaped early cities and social complexity in southern Mesopotamia, although this is clearly an important topic of future research. Particularly now, as southern Iraq is increasingly investigated, we are already beginning to see that settlement occupation of southern Iraq is likely much older than previously thought (e.g., Jotheri et al., 2017; Altaweel et al., In press). The recession of the Persian Gulf's waters and development of the southern Mesopotamian delta meant that societies did not only depend on agriculture but also the rich abundance that marshlands provided. The role of Mesopotamia's climate has been assumed to have always been very dry, but even that picture is likely to change (e.g., see Marsh et al., 2018). New research will undoubtedly change how we see the rise of early complex societies, its relationship to water, and how the world's first cities developed. Such research may help us understand some of the origins of ideas that have shaped our own societies.

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