

# Irrigation Management in Ancient Iran: A Survey of Sasanian Water Politics

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## Abstract

Due to the arid climate of the Iranian plateau, water has traditionally played an integral role in securing political power. Indeed, the Iranologist, Richard Nelson Frye, has referred to water as the “life blood of Iran.”<sup>1</sup> Considering the environment, it is not surprising that the Iranians developed the earliest, most sophisticated form of irrigation in the world, the *qanat* system. Archaeologists and Iran scholars are currently researching the role of the government in managing these irrigation systems. At the “Ancient Iranian Water Systems Seminar” at Durham University in 2011, international Iran scholars concluded that early irrigation systems were built and managed on a local basis, but by the Sasanian period, this management was co-opted by the Sasanian bureaucracy. My research seeks to investigate this trend to centralize water management under the Sasanians. My project will be driven by such questions as: *What incentivized the Sasanian bureaucracy to centralize irrigation? How does water management effect efficient governing? Which Sasanian kings focus the most on irrigation projects? What role did water play in the Sasanian understanding of Zoroastrianism? Do religion, politics, and economics overlap in a common emphasis on water management in ancient Iran?*

## Introduction

The majority of the earliest agricultural civilizations developed in the Middle East, a region known for its aridity. Since the ancient Assyrians, Middle Eastern civilizations have engineered ingenious technologies to capitalize upon the limited water supply. The most famous ancient civilization associated with the development of water technology is the Persian Empire. However, today, due to environmental and political crises, agriculture and irrigation instability threaten the future of the Middle East. I hope my research will contribute to the burgeoning study of water in the Middle East by utilizing history to propose future irrigation reforms.

The cradle of civilization is said to be the Fertile Crescent of Mesopotamia, in modern-day Iraq. Indeed, this region has served as the breadbasket for a large portion of the Middle East since the Neolithic Revolution. Due to its immense environment wealth, and its lowland topography, Mesopotamia has been subject to nearly continuous invasions, perhaps the most famous being the Persian invasion in the 6<sup>th</sup> century B.C.E. The heart of the ancient Persian Empire was located in Fars, on the arid Iranian Plateau. On the Iranian Plateau, water is scarce; the majority of Iran only receives approximately 10 inches of rain a year.<sup>2</sup> With such scarce precipitation,

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<sup>1</sup> Frye, Richard Nelson. *Iran* (Henry Holt and Co, 1953) Pp 6.

<sup>2</sup> Wulff, H.E. “The Qanats of Iran”. *Scientific American*, April 1968, p 94.



historians have marveled at the level of agricultural success that the Persian Empire achieved—producing enough to sustain a booming population, while harvesting enough to trade the surplus. During the Sasanian period, the Iranian dynasty focused its centralization efforts on irrigation projects, particularly in Mesopotamia. More efficient irrigation meant an increase in agriculture production. An increase in agriculture production meant an increase in tax collection. This increase in taxes paid for increasing numbers of wars to expand the Persian Empire. In this way, the Sasanians focused so much on centralizing control of irrigation, not for the sake of water itself, but for the political and economic power afforded by water control.

When considering the environment of modern day Iran and Iraq, it is little wonder that throughout ancient history Iran repeatedly sought dominance over its fertile, geographically unprotected Western neighbor. In this way, cultural, religious, and political developments of Iran and Iraq may be analyzed through the lens of irrigation management. Indeed, an overview of irrigation management in ancient Iran necessitates a survey of both Iran and Iraq. Having conquered Mesopotamia in the 6<sup>th</sup> century B.C.E, the ancient Iranian dynasties relied on this fertile region for agriculture, taxation, and even political purposes. At the time of the Arab conquest in the 7<sup>th</sup> century C.E, the Sasanian capital was located in Ctesiphon, in the region of modern-day Baghdad, Iraq. Once the Arabs wrestled Mesopotamia from Persian control, the rest of the Sasanian Empire fell quickly. One may argue that the loss of Mesopotamia to the Arabs undermined the Persian Empire to such an extent that the Persian Empire never regained its might or breadth.

The choice to utilize irrigation management to analyze cultural and political history is not novel; however, it has yet to be applied to Iran and Iraq. By far the most famous water historian is Karl August Wittfogel, the German Marxist who argued in his book, *Oriental Despotism: A Comparative Study of Total Power* (1957), that the development of Chinese culture and government was determined by the control of water. Wittfogel asserted that Chinese emperors utilized water management as a means of leveraging power over their subjects. In this way, the Chinese empire was a “hydraulic society” in that its government and society was dependent on irrigation systems.<sup>3</sup> However, centralized power over irrigation in empires as extensive as China’s requires constant upkeep and expenses. Thus to maintain this level of water control, Chinese emperors levied forced labor. In this way, water control necessitated despotism in China. According to Wittfogel, the only way for a ruler to attain supreme power is by solely controlling the water supply. While Wittfogel limited his water analysis to China, my project will seek to analyze the history of Iran-Iraq through the lens of irrigation development. In the tradition of Wittfogel, I intend to utilize irrigation management to assess the politics and culture of the Sasanian dynasty. Due to the mutual dependence of their civilizations on the breadbasket of Mesopotamia and the water sources of the Tigris-Euphrates, I will use “water history” to bridge nation divisions and analyze Iran and Iraq in conjunction. Writing the history of the environment, and especially of water, allows me to transcend the confines of the nation-state that limit purely political works.

## **Ancient Irrigation Structures**

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<sup>3</sup> Wittfogel, Karl August. *Oriental Despotism: A Comparative Study of Total Power* (Vintage Books: 1981).



To this day, the *qanat* system, developed in ancient Iran, is considered one of the most efficient and important works of technology in history. Developed 2,500 years ago in modern-day Armenia, the *qanat* was originally known as *karez* in Middle Persian.<sup>4</sup> “*Kar*” means, “to draw furrows”, and “*rez*” means “to flow”. The *karez* conducts water from the level of an aquifer to the open air by gravitational pull in order to distribute it to areas of lower altitude. This technology is primarily used for irrigation (*abyari*) and household water. Until the middle of the 20<sup>th</sup> century, these chain wells remained the preferred irrigation technology for the majority of agrarian society in Iran and the Middle East. As of 1968, *qanats* supplied 75% of all water used in Iran—for domestic and irrigation purposes. In fact, until the construction of the Karaj Dam in 1961, the million inhabitants of Tehran depended on *qanats*, carrying water from the base of the Elburz mountains, for their entire water supply.<sup>5</sup>

While scholars contend that *qanat* technology was developed before the Achaemenid period, archaeological evidence shows that the dynasty’s rulers spread the system to Egypt, the Levant, and the Arabian Peninsula from 550-331 BCE. Until today, aerial photographs reveal distinctive chains of wells dotting these *qanat*-watered regions. The Sasanians inherited and expanded this irrigation technology by conscribing roving bands of slaves to construct these intricate chain-wells throughout their empire.<sup>6</sup> In such arid landscapes, water is integral to human life; thus its just and efficient management is paramount not just to the public, but also to the success of the ruler.

Water histories provide a unique insight into the perspective of “ordinary people”. In particular, *qanats* boast a historic link with village socio-economic organization and patterns of ownership and tenure.<sup>7</sup> In this way, to produce a meaningful analysis of the *qanat* system in the Sasanian period, archaeological discoveries must be contextualized within the religious, political and agricultural trends experienced by “ordinary people”. On a social level, access to water in dry climates indicates wealth and prestige. In towns watered by *qanats*, the water stream traveling through the chains first entered through the gardens of the wealthiest compounds, and then ran downhill through the poorer homes, finally ending as irrigation in agriculture fields.<sup>8</sup> In this way, the proximity of each household to the water source determined the quality and quantity of its water supply, and, thus, reflected the socio-economic status of the occupant. Elite homes, located in the upper sections, accessed clean and plentiful water; whereas poorer households of sharecroppers located downstream, accessed less water polluted by use.<sup>9</sup> For example, to this day, North Tehran is known to be the elite section of the city, while South Tehran is known to be the poorer section. This geographical socio-economic hierarchy derives from water supply, and specifically from the ancient *qanat* system. Pure water from the base of the Elborz Mountains was carried through thirty-six *qanat* systems entering through the northern, higher-

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<sup>4</sup> English, Paul Ward, “The Origin and Spread of Qanats in the Old World,” *Proceedings of the American Philosophical Society*, 112:3 (1968). Pp 175. The original location of *qanats* in Armenia is a long-established belief that is currently under dispute by leading archaeologists.

<sup>5</sup> Wulff, H.E. “The Qanats of Iran”. *Scientific American*, April 1968, p 96.

<sup>6</sup> Ibid 171

<sup>7</sup> English, Paul Ward. “The Origin and Spread of Qanats in the Old World,” *Proceedings of the American Philosophical Society*, 112:3 (1968), Pp 170.

<sup>8</sup> Ibid 179

<sup>9</sup> Ibid



elevation portion of the city. In this way, access to pure water attracted wealthier families to settle in this area. Poorer families could only afford to live in the southern, lower altitude level of the city, thereby receiving water already tainted by the wealthy families in the north<sup>10</sup>.

*Qanats* also determined political prestige. Since Achaemenid times, most *qanats* were built by local agriculturalists. However, during the Sasanian era, Persian kings began centralizing their control over irrigation systems. Iranologists have argued that the popularity of a Sasanian king was evaluated by the populace largely on the basis of the number of *qanats* built during his reign.<sup>11</sup> In this way, research of water management in ancient Iran lends itself to the study of the "archaeology of power", in the tradition of Wittfogel's model of hydraulic civilizations. Archaeologists determine that imperial authorities began constructing major water systems in Iran in the first millennium B.C.E.<sup>12</sup> However, at a 2011 conference at Durham University, scholars contended that simply because these early systems appear large in scale, their size does not determine imperial management. Dr. Peter Magee, in fact, argued that these water systems were built on a local basis by small-scale societies, and that there were multiple centers of water origin.<sup>13</sup> Magee contended that these water systems of ancient Iran, including *qanats*, were only truly subsumed under imperial management during the Sasanian dynasty. Perhaps the largest and most consequential water system constructed during the Sasanian era was the Nahrawan Canal, built under the auspices of the Sasanian king, Xusro I (reigning 531-579 C.E). The Nahrawan Canal funneled water from the Tigris River. This Sasanian-built canal came to serve as the main water supply for the Abbasid capital of Baghdad, irrigating the region that served as the city's breadbasket. Scholars have suggested that the canal's destruction beginning in the mid-10th century influenced the Abbasid Caliphate's decline.

## Ancient Water Laws

Beyond archaeological evidence, scholars of ancient Iran can determine the political and societal influence of water systems based on Sasanian law. One of the most important surviving legal sources from the Sasanian period is *The Book of a Thousand Judgements: A Sasanian Law-Book*. The *Law Book* is a compilation of legal cases, composed during the reign of Xusro I.<sup>14</sup> Sasanian law derived legitimacy from the Zoroastrian *Avesta*.<sup>15</sup> Beyond religious interpretations, the *Law Book* reveals the high level of centralization achieved by the time of Xusro I. This sophisticated and thorough treatment of legal rights reflects Sasanian irrigation

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<sup>10</sup> Braun, Cornel. *Teheran, Marrakesch und Madrid: Ihre Wasserversorgung mit Hilfe von Qanaten, Eine stadtgeographische Konvergenz auf kulturhistorischer Grundlage (Bonner Geographische Abhandlungen 52)*, Bonn: Ferd. Duemmlers Verlag, 1974, p. 113.

<sup>11</sup> English, Paul Ward, "The Origin and Spread of Qanats in the Old World," *Proceedings of the American Philosophical Society*, 112:3 (1968), Pp 178.

<sup>12</sup> Boucharlat, Remy; De Schacht, Tijis; Ertsen, Maurits W; Gillmore, Gavin; Kennet, Derek; Magee, Peter; Rezakhani, Khodadad; Wilkenon, T.J. "From human niche construction to imperial power: long-term trends in ancient Iranian water systems" *Water History*, July 2012, Vol 4, Issue 2, pp 155-176.

<sup>13</sup> Ibid.

<sup>14</sup> Perikhanian, Anahit; tr. Nina Garsoian. *The Book of A Thousand Judgments: A Sasanian Law-Book* (Mazda Publishers: 1997), Pp 13.

<sup>15</sup> Ibid.



management. Chapter Thirty-Four particularly concerns a legal case regarding water rights during the Sasanian era.<sup>16</sup> The case transpires in Mesopotamia and concerns partners sharing irrigation sources.

Indeed, due to the large presence of the Sasanians in Mesopotamia, scholars can also derive Sasanian law from the *Babylonian Talmud*. The *Talmud* is a central rabbinic text, second only to the *Torah* in the Jewish faith. The *Babylonian Talmud* (*Talmud Bavli*) was compiled by Jews living in Mesopotamia during the course of Sasanian rule from the 3<sup>rd</sup> to the 5<sup>th</sup> centuries C.E. In this way, the *Talmud* recounts many legal and even cultural aspects of the Sasanian Empire. One of the leading scholars who advocates for the comparison of the *Babylonian Talmud* and Sasanian texts is Dr. Yaakov Elman. In his article, “‘Up to the Ears’ in Horses’ Necks (B.M. 108a): On Sasanian Agricultural Policy and Private Eminent Domain”, Elman analyzes Sasanian irrigation law and management from the ancient Mesopotamian rabbinic text. Before commencing his interpretation, he contextualizes the legal case within the economic and cultural environment of Mesopotamia under Sasanian rule. Elman highlights the Persian’s hunger for arable land due to the aridity of the Iranian plateau, in addition to the Babylonian Jew’s hunger for increased agriculture productivity due to the over-population of Mesopotamia.<sup>17</sup> In this way, the Sasanians sought to maintain tight control over Mesopotamia to ensure an influx of surplus food into the arid Iranian plateau. Increased agricultural wealth in Mesopotamia also allowed for higher taxes to be collected by the Sasanians from this wealthy region. In return, the Babylonian Jews largely accommodated Sasanian rule so long as the government provided support for agricultural growth, which included the construction of irrigation projects. Elman concludes that this relationship between the Babylonian Jews and the Sasanian government led to a surge in irrigation projects in Mesopotamia, especially maximizing the irrigation potential of the Euphrates and Tigris rivers.<sup>18</sup> In this way, a mutual interest in agriculture bound two religious communities in Late Antiquity.

In fact, Elman builds on these ancient legal sources to determine the cultural and religious nature of the Sasanians. To begin, he notes that the Zoroastrian religion highly encourages agriculture.<sup>19</sup> In particular, he consults the *Dēnkard* for instances of the veneration of water. In addition, the Sasanian dynasty’s nearly constant war campaigns led to increased demands for agricultural productivity from areas such as Mesopotamia during times of augmented warfare.<sup>20</sup> Furthermore, based on the legal indications of water rights, Elman confirms that Sasanian society was highly feudalistic and even capitalist in nature. Towards the end of the dynasty, Sasanian kings encouraged wealthy families to invest in irrigation technology. In fact, during the Sasanian era, canal building was a profitable business.<sup>21</sup> This analysis reflects Xusro I’s social and political transformation that empowered the aristocracy after his father’s proto-communist Mazdakite Revolution. Indeed, Xusro I, who arranged for the codification of Sasanian legal cases that comprised *The Book of a Thousand Judgements: A Sasanian Law-Book*,

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<sup>16</sup> Ibid. 201.

<sup>17</sup> Elman, Yaakov. “‘Up to the Ears’ In Horses’ Necks (B.M. 108a): On Sasanian Agricultural Policy and Private Eminent Domain”. *JSIJ* 3 (2004). Pp 104.

<sup>18</sup> Ibid. 108.

<sup>19</sup> Ibid. 134.

<sup>20</sup> Ibid. 135.

<sup>21</sup> Ibid.

centralized the Sasanian administration more than any prior Sasanian ruler.<sup>22</sup> This centralization and increase in agricultural productivity supports the claims by the *Babylonian Talmud* that Xusro I invested in major irrigation projects in Mesopotamia, ranging from dams to canals. The Babylonian Talmud even reports that the Sasanian government changed the courses of both the Tigris and the Euphrates rivers.<sup>23</sup>

## Water and Zoroastrianism in Ancient Iran

Many of the most famous Sasanian rock reliefs depict the water goddess, Anahita, investing the kings with holy legitimacy or “grace”. Zoroastrian scholar, Mary Boyce, contends that the goddess Anahita existed in Iran before the creation of Zoroastrianism. In fact, it was only with the Achaemenid king, Artaxerxes II (404-358 B.C.E) that Anahita became incorporated into the faith. Artaxerxes commissioned the spread of images and temples dedicated to Anahita throughout his empire. The area of modern-day Armenia became a center for the Anahita cult. Armenia is also the birthplace of the *qanat* system, the ancient Iranian irrigation technology that to this day nourishes arid soils throughout the expanse of the former Persian Empire. Water was integral, both spiritually and materially, to ancient Iranians.

From the Achaemenid period, Anahita came to anthropomorphize the integral element of water in Zoroastrian cosmology. According to the *Bundahishn*, water (*aban*) was the second of seven creations of the material universe. Water is the lower half of everything; the world rests on a large sea (*Vourukasha*) that is fed by two rivers that encircle the earth. A tidal sea, (*Putik*, in Middle Persian), cleanses these rivers before they flow back into *Vourukasha*. *Aban Yast* is the compellation of Zoroastrian hymns most associated with water. Almost every one of the Avestan hymns calls for sacrifices to be made to Anahita, who is depicted as a strong, white-skinned woman riding a chariot drawn by four horses: wind, rain, clouds and sleet (*Yast* 5. 120). As a water-divinity, she is worshiped as the granter of fertility: the nurturer of crops, herds, and mankind. The *Aban Yast* contends that Anahita is so important that Ahura Mazda gave her a separate existence to help with the struggle of the good creation against evil. However, scholars believe that the *Aban Yast* was not transcribed until the Sasanian period. *What special interest would the Sasanian kings have in incorporating water into the religious culture of their realm?*

After Artaxerxes II, Anahita reemerged as the Zoroastrian deity most associated with kingship during the reign of Ardashir I, the first Sasanian king. In fact, the Sasanian dynasty originated as protectors of the Anahita temple in Estakr, presumed to have been built by Artaxerxes II. Around the end of the 2nd century B.C.E., the temple of Anahita at Estakr fell under the custodianship of Sasan, patriarch of the future Iranian dynasty.<sup>24</sup> His son, Papak, killed the king of Estakr and seized the throne. Scholars believe that Papak continued to be the high priest of the Anahita temple, even after he became king.<sup>25</sup> In this way, Papak used his connection with the water-goddess to justify his spiritual and political authority. Archaeologists believe that Papak sent the heads of his enemies to the temple of Anahita as tribute for ridding evil from

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<sup>22</sup> Ibid. 141.

<sup>23</sup> Ibid. 143.

<sup>24</sup> Nöldeke, Theodor. *Aufsätze zur persischen Geschichte* (Leipzig: 1887), pp. 4

<sup>25</sup> Herzfeld, Ernst. *Iran in the Ancient East*, London (Oxford:1941), pp. 307





the world and restoring order and fertility.<sup>26</sup> In this way, Anahita served as the patron divinity (under Ohrmazd) of the Sasanians. Her cult flourished during their rule, just as it had two empires before under the Achaemenids. The Sasanian kings who appear to have shown the most support for the Anahita cult are: Ardashir I, Narseh, Hormizd II, Shapur II and Bahram II. There is little doubt that under the Sasanians, Anahita overshadowed all other female divinities as far as private prayers and devotion were concerned. *Is it purely coincidence that irrigation technology, such as the qanat system, experienced the greatest level of government support during the dynasties that most revered the water goddess Anahita?* Further theological and archaeological study is needed to address this correlation.

The religious importance of water is exemplified by myriad images of Anahita in Sasanian art. In an investiture scene carved at Naqsh-e Rostam, Narseh had himself represented receiving the diadem of kingship from the hand of a female divinity generally recognized as Anahita.<sup>27</sup> Xusro II also appears in an investiture scene carved in high relief in the grotto of Tāq-e Bostān, where he receives crowns from Ohrmazd and Anahita. In this rock relief, the goddess wears a crown similar to Ohrmazd's and holds a pitcher of flowing water in her left hand.<sup>28</sup> Beyond rock reliefs, Anahita's investiture appears on the reverse side of Sasanian coins.<sup>29</sup> *Considering the Sasanian Empire emerged from Fars, on an arid plateau, perhaps the dynasty's choice to associate with the water-goddess Anahita implied not just claims of economic, but socio-political symbolic power? In such arid lands, did the legitimacy of the ruler depend on his/her ability to provide water to Sasanian subjects? Conversely, did his/her failure to provide adequate water supply result in political upheaval?*

## Ancient Water Politics

Kingship in Sasanian Iran combined notions of spiritual and material legitimacy. To retain legitimacy, the king must prove not only that he descended from the righteous kings of the Achaemenid dynasty, but more importantly, from the spiritual Kayanian dynasty of the Zoroastrian Avesta.<sup>30</sup> The Sasanian emperors were seen as both descendents of the gods and as mortals. In this way if he/she failed to maintain the material wealth of the empire and protect it from evil (such as famine or corruption), he/she may be deposed on religious grounds.

Perhaps one of the greatest successes of the Sasanian dynasty was the merging the formally feudal-based areas into a centralized empire. To do this, the dynasty developed new ideas of government, such as forming a professional enlisted army. The Sasanians used Zoroastrianism, as the official religion, to justify such centralization methods. Choksky writes of Sasanian rule: "The close association and political interdependence of state and church which developed in the Sasanian Empire thus enabled the kings to seek legitimacy for their rule in Zoroastrian doctrines". He coins the term, "sacred kingship", to describe the nuances of this novel government strategy. The Sasanian royal family proclaimed to gain their legitimacy to rule from

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<sup>26</sup> Nöldeke, Theodor. *Aufsätze zur persischen Geschichte* (Leipzig: 1887).pp. 17

<sup>27</sup> Christensen, Arthur. *L'Iran sous les Sassanides* (Paris:1936), pp. 252-53

<sup>28</sup> Berghe, Vanden. *Archéologie de l'Iran ancien* (E.J Brill:1959), pp. 104

<sup>29</sup> Göbl, Robert. *Sasanian Numismatics* (Klinkhardt & Biermann: 1971).

<sup>30</sup> Choksky, Jamsheed K. "Sacral Kingship in Sasanian Iran", *Bulletin of the Asia Institute* 2 (1988): Pp 36.



Ahura Mazda, whose holy investiture was most often granted by Anahita, the water goddess. The image of Anahita bequeathing investiture to various Sasanian rulers was placed on coins to remind citizens of this holy connection.

When positioned in the context of “sacral kingship”, the connotation of Anahita’s investiture to the Sasanians poses potential for further historical analysis. According to the expectations of this Zoroastrian notion of government, to remain in power the king must maintain the material prosperity of the empire. Since all material growth derives from Ahura Mazda, the holy rectitude of the Sasanian king could be determined by the material health of the people.<sup>31</sup> In this way, the element of water, embodied by Anahita, symbolizes the material requirements needing defense by a righteous Sasanian king. Throughout the *Avesta*, the righteous dynasty, the Kayanids, are depicted as slaying dragons (symbolic of evil and corruption) and thus freeing the waters of the world (the material realm of agricultural fertility). The first Sasanian king, Ardashir, sought to create a link from his mortal dynasty to the Kayanids and thus depicted himself as slaying the dragon of Kerman, and thus bringing rain, fertility and stability to the empire. Choksy writes that, “The motif of a ruler or god as the bringer of rain, and hence fertility, through battle with forces which withhold water from the world” is of great importance in antiquity. In this way, the Zoroastrian tradition practiced during the Sasanian era was far from mendicant. “Sacral kingship” demanded evidence of material strength.

In this way, it appears that legitimacy was by no means assured for the Sasanian kings. If an aspiring rival or magian sought to depose an emperor from power, he could simply use the material losses of the empire to prove his/her religious illegitimacy. If the king failed in his duties to uphold the fertility of the land, he could lose his claim to “sacral kingship”. Indeed, after the first two centuries, this notion of “sacral kingship” fell under more intense scrutiny by the nobles and religious elite. By the 4<sup>th</sup> c C.E, this class began to depose and kill Sasanian kings with more frequency. Choksy notes: “Expansion of the bureaucratic class during the reign of Emperor Shapur II may have been perceived by the nobles as a threat to their political power and influences, causing them to protect their interests by deposing monarchs who opposed their wishes”. *Could this threat to his “sacral kingship” have induced Shapur II to particularly associate himself with Anahita, the bringer of fertility, and thus royal legitimacy?* Shapur II spent most of his time not in Fars, but in Ctesiphon in Mesopotamia, the breadbasket of the empire. *Did he seek to assert greater control over agricultural management as the empire expanded, to ensure that he maintained his legitimacy as Zoroastrian ruler, descendant of the Kayanids?* While this paper presented a survey of water politics in Sasanian Iran, further research is required to answer many remaining questions.

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<sup>31</sup> Ibid.



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