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Private Property and the Commons: The Case Study of Water Distribution in Persian Qanats

From Abundance to Drought: Cultural Patterns of Water Management and Knowledge Before Private Property Went Mainstream

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Abstract: Although the geographical area historically known as “Persia” has never been properly a “fertile land”, water shortage did not represent a problem for the diverse and multiple populations that inhabited the Iranian Plateau throughout millennia. The ancient Persian civilization could flourish thanks to sophisticated water knowledge and water management strategies that allowed it to become the dominating culture of the vast Persian Empire, which by the year 500 BC, extended from the borders of India to the western coasts of Minor Asia and the Caucasus. Even after the fall of the empire, the successive populations could live in arid areas thanks to an ancient system of water provision and management called “Qanat”. Qanats not only provided water from an underneath water spring to desert lands and remote areas of the region; they also reflected a specific “water cultural system” based on sharing and managing water as a common good. The paper will discuss how water shortage in present day Iran is, on the one hand, related to a progressive abandonment of the Qanats system, substituted by the use of modern irrigation systems, the privatization of water and the progressive abandonment of the common. On the other hand, this abandonment is related with dramatic cultural change and weakening of community identity, impacting the sustainability of human life in the Iranian Plateau’s arid areas.

Keywords: property; commons; west/east; law & anthropology

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1 When Deserts Become Gardens. Water Folk Culture in Iran

A very popular Persian folk tale called “The garden of Babai” tells the story of a sheep called Babai, wandering in the desert of central Persia.

In the sheep’s fleece there are seeds from plants and trees that deposited there through time.

From underneath the ground in the desert, Babai the sheep finds a water spring; while she settles near the water source, wind scatters the seeds from her fleece to the ground. Water makes the ground fertile, so the seeds become plants, trees and flowers. All this blossoming vegetation attracts many other birds and animals, which turn the once desert landscape into a beautiful garden; Babai the sheep stands in the middle of the garden, surrounded by flowers, trees and all kinds of living beings; all together, they make up a beautiful decoration, just like the gardens and animals pictured in traditional Persian carpets.¹

This folktale represents how the idea of “deserts becoming gardens” is somehow strongly embedded in Persian folk culture, although gardens are not immediately associated with most of the dry Iranian landscape, where more than two thirds of land is arid, and receives less than 50 mm of rainfall a year.

Walking through the dusty streets of cities like Kerman, Yazd, Kashan, one would never guess that behind the high fences on the sidewalks hide beautiful traditional gardens² with roses, tulips, and water springs at their center. No traditional Persian house was ever conceived without a garden, surrounding a water spring at the center of the household. Today, although modern buildings of concrete are the majority of housing types in Iran, some traditional houses remain as evidence of this particular past, where water was at the center of all human activity.

Persian folk water culture is thus embedded in how houses and families were conceived around water, how villages were organized and structured and – as a consequence – how social power – just like water – was distributed.

In other words, if social hierarchies were reflected in water distribution, social cohesion could be maintained only by a fair amount of water distributed for each family and community member.

Everyday life would be thus organized around water springs that would stand at the center of all human activities, just like the sheep Babai in the folk tale, who stands at the center of the garden flourishing in the desert.

¹ Sadat M., *Il giardino di Babai. Due racconti persiani*, Jaca Books, 2004.

² Memarian, G. H., F. E. Brown F. E. *Patterns of privacy and hospitality in the traditional Persian House*. International Association for the Study of Traditional Environments, 220 (3): 181–198.

Gardens and water became an inseparable pair of nouns for Persian folk culture and tradition. Thanks to this pairing, gardens could be conceived through Iranian architectural, spatial and social history not only as special places of relief from heat, places for socialization or of celebration, but also as crucial spiritual and religious symbols: for pre-Islamic Iranian religions, such as Manicheism and Zoroastrianism, the Persian garden would represent the symbol of paradise, or the search for beauty and perfection on earth. The English word “paradise”, comes, in fact, from the ancient Avestan-Iranian word “pairidaeza”, meaning “garden surrounded by walls” (or prohibited garden).³

After the Arab conquest of Persia, the garden would be adopted as the symbol of heaven for Muslim believers, in continuity with pre-Islamic religious beliefs. All great Mosques built in Iran from the tenth century onward, have been projected around a source of water. For the Islamic tradition, water represents purity and it is a core element of the cult, thus sacred spaces of Islamic architecture were organized around and about water.

Considering that culture, religion and technology are different parts of a unique system of survival and organization of life in a specific environment,⁴ we can easily understand that the rise of the garden as a cultural, spiritual and traditional symbol in Persia was possible because of specific technological knowledge on the provision, distribution and management of water.

That knowledge was called Qanat, and has functioned as one of the best practices regarding water knowledge and management for thousands of years.

2 A Brief History of Qanats

It is impossible to talk about Persian civilization without reference to the underground channels known as Qanats, which use gravity to transport water from underneath aquifers to the surface, for irrigation and drinking.

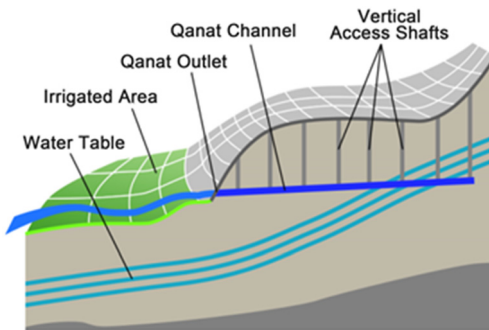
Qanat systems are based on a simple and resource efficient technology. They comprise an underground gallery and tunnel system for transporting large quantities of water by gravity, a series of vertical shafts, from the technical point of view: however, this transformation is only made possible through a multidimensional

³ Moynihan E. B. (1979), *Paradise as a Garden in Persia and Mughal India*, New York, George Braziller.

⁴ Here I am adopting the cultural materialistic perspective of Marvin Harris. See Harris M. (1968), *The rise of Anthropological Theory. A History of Theories of Culture*, Walnut Creek, California, Altamira Press.

human–environment interaction, a system entailing a dedicated human community, the creation of institutions for water sharing,⁵ technical knowledge and a proper territory.

Qanats system may also incorporate watermills, reservoirs and hammams. Recycling and re-use of water is encouraged at different stages along the tunnels, so that waste and pollution rates are low and only the overflow of groundwater pours into the gallery and enters the system.⁶



For thousands of years, Iran has relied on socio-economic networks to manage groundwater and the traditional method of water-exploitation of Qanats which represent an effective system of social corporation and civic participation in water management and in solving the issue of water scarcity in dry regions.⁷

Much of the population of Iran historically depended on the waters of Qanat, and areas of population often correspond closely to the areas where this system developed.⁸

It can be argued that the Qanat allowed Iranian civilization to flourish alongside other ancient civilizations that were situated along major rivers. The historical presence of the Qanat in people’s daily lives made it central to Iranian society, and legal structures evolved in time to manage its construction, operation, and maintenance.

⁵ Wulff, H. E. (1968) “The Qanats of Iran.” *Scientific American* 218 (4): 94–107.

⁶ Labbaf Khaneiki, M. (2020). *Qanat – summary paper prepared as input for case study*. International Center on Qanats and Historic Hydraulic Structures – United Nations Educational, Scientific and Cultural Organization Category II Center,

⁷ Madani, K. (2014) “Water management in Iran: What is causing the looming crisis.” *Journal of Environmental Studies and Sciences* 4 (4),): 315–328.

⁸ Kheirabadi M. (2000), *Iranian cities. Formation and development*. Syracuse University Press.

Qanats are expensive to build and expensive to maintain, but their appearance in the dry lands of the Northern Hemisphere is nearly circumglobal, because for centuries Qanats have been the most valuable means of water supply in regions where water is scarce.

The management of Qanats has therefore varied by region and country: there isn't a single set of dedicated rules to apply to this complex system, namely because – even though this paper is considering the specific Iranian case study – the Qanat technology spread all over the globe: from Egypt it arrived to the Levant and to Arabia in Achaemenid times (550–331 B.C.). The Arabs, during the Islamic conquest (622–750), carried Qanats across North Africa into Spain, Southern Italy and Cyprus; variations of Qanats were also found in Central Asia, western China, and on a more limited scale, in dry regions of Latin America. Somewhere between 4000 BC and the nineteenth century, Qanat became a global water technology, whose origin could be traced back to the Iranian Plateau.⁹

Even with all the variations and adaptations of Qanats to different geographical areas and ethnic groups, however, these specific modes of water provision were generally regulated by some recurring, global principles based on the following key aspects.

In the first place: Qanats are a multidimensional, dynamic technology. To exist and function, they must entail water rights and ownership, water allocation regulation, a community that shares a common identity and social ties, a specific environment, a set of cultural and religious beliefs, a specific water culture, where water demand and customs adapted to a limited availability of water.

Qanats developed a fair and equitable system for allocating water among users. This may have involved permits or licenses for water use. Each Qanat would be associated with a determined ownership, like a family, a tribe, or a neighborhood. A set of water rights, involving local rules and regulations, would specify who could use the water and for what purposes. The regulations were constantly adapting to water availability, so that they would not represent a fixed set of laws, but were determined by a constant process of negotiation and adaptation to climate, social needs and ecological or territorial variations.

Secondly, Qanats are flexible, like the cultures they reflect. If we consider a small-scale society as a system¹⁰ not only made by subjects, but by both subjects and objects, Qanats, humans and the environment would represent an entangled system

9 English, P. W. (1968). "The Origin and Spread of Qanats in the Old World." *Proceedings of the American Philosophical Society*, 112(3): 170–181.

10 The Theory of society as a system is well known in sociological tradition: I here specifically refer to Timothy Morton's idea of a net in which not only the subjects, but objects form a magnetic field of relations, in other words a system: Morton T. (2013), *Hyperobjects. Philosophy and Ecology after the end of the World*, University of Minnesota Press, Minneapolis.

of production and reproduction, marked by constant evolution at different levels: at the social level, between members of the community; at an environmental level, a living community adapting to a hyperobject which is the environment; at a technical level, the constant transmission and improvement of knowledge of the Qanat itself and its management and use. Another crucial feature involved in Qanats was, for example, their maintenance and repair. Each local community would establish guidelines for their maintenance to ensure their functionality water quality through a constant monitoring and prevent water loss.

Conservation of water would thus involve and engage local communities in the implementation of measures to conserve water and prevent wastage. This aspect would be related to environmental protection, which would consider the impact of Qanat use in a land and implement measures to protect ecosystems and aquifers. Throughout these processes, communities would be constantly involved in setting the boundaries for their own sustainability, building up a network of interaction¹¹ not only related to the practical or technical management of the Qanat and the water resources, but also engaged in political choices and in religious practices.

Third, Qanats reflect embodied power relations. The system of Qanat would not function without regulation and enforcement of mechanisms for enforcing Qanat management rules, including penalties for violations, respect for social hierarchies and political hierarchies. Local power dynamics would be reflected in water distribution, but also balanced by the awareness that social justice would be crucial for the existence of Qanat itself.

In this entanglement, social transformations would be determined as a whole, in a multidirectional process relating hydrology, climate, community, identities, Qanats, religion, biology, knowledge and power; the interaction among these objects, subjects and hyper-objects would create what jurists call a common, which is a property that is jointly owned or accessed by multiple individuals or entities, subject to legal regulations or restrictions. But while the process of creation of Qanats as commons has been a multi layered, dynamic, multi directional, flexible and embodied process, what happened later, with the introduction of modern means of water extraction and state regulated water usage is the exact opposite: water management became one dimensional,¹² fixed, disembodied. Processes of water distribution were polarized and top down. This historical turn represented the separation of human subjects as direct and conscious agents immersed in the hyperobject (the

¹¹ Latour B. (2005), *Reassembling the Social: An Introduction to Actor-Network Theory*, Oxford:Oxford University Press.

¹² I here borrow one well known philosophical category by Herbert Marcuse, see Marcuse H. (1964) *One dimensional man. Studies in the Ideology of Advanced Industrial Society*, Beacon Press, 1964.

environment), determining the great drought and environmental disaster of present times.

3 Regulating Qanats through Time

Most Qanats were built by powerful political rulers and, in countries like Iran, since the tenth century, each leader was evaluated on the basis of the number of Qanats (and mosques) constructed during his reign.¹³ In other words, Qanats were entangled with politics and, moreover, with social well-being, considered as public works dedicated to the community, with the purpose to acknowledge a ruler.

The Qanat was built of local materials; sometimes slaves were given the task of constructing them under the supervision of an expert and maintenance was solved by a corvée.¹⁴

Qanats were regulated by local communities and rulers, however in many cases, Qanats were community-owned and maintained; if this was the case, local communities were responsible for the construction, maintenance, and equitable distribution of water. Elders or local leaders often oversaw this operation.

With the Arab conquest of Persia, Qanat regulation became influenced by Islamic law. Islamic principles encouraged fair and equitable water distribution and local authorities, often under the guidance of Islamic scholars, played a role in regulating Qanats.

During the eighteenth and nineteenth centuries, powerful empires or rulers took control of Qanat systems. For example, the Qajar dynasty in Iran established a formal bureaucracy for Qanat management in the nineteenth century, with an effort to centralize the local power distribution of water.¹⁵

This process of centralization was at the core of a bigger modernization process that started in Iran at the end of the eighteenth century, deeply changing society and its cultural mindset.

The Qajar dynasty would accompany Iran towards the creation of a modern Nation State,¹⁶ following especially French and Russian national models, redefining property, families and even gender roles.¹⁷ Later, under the Pahlavi dynasty, the

13 Goblot, H.(1979). “ *Les Qanats: une technique d’acquisition de l’eau*”. Paris: Mouton,.

14 English P.W. (1968). *The Origin and Spread of Qanats* cit. at 171 ff.

15 Delavari-Edalat F., M. Reza Abdi (eds.). (2017). *Adaptive Water Management: Concepts, Principles and Applications for Sustainable Development*. Berlin: Springer.

16 See Anderson B., *Imagined Communities. Reflections on the origins and spread of nationalism*, Verso, London, New York, 1991.

17 Regarding the transformation of society and modernization processes under Qajar Iran, see Najmabadi A.,(1988) *Land reform and Social Change in Iran*, University of Utah Press.

top-down modernization process was being empowered through a series of legal reforms being passed in the Iranian parliament (in 1930 and 1934) under the rubric of Qanat Laws.¹⁸

For the first time, these laws were disempowering local landlords and letting the State regulate the water issues regarding Qanats.

These laws emphasized the independence of water ownership from land ownership, recognizing the rights of landowners, but giving priority to the rights of water owners. If someone, for example, wanted to construct a new Qanat, or repair an existing one by digging a new well or channel, the landowner did not have the right to prevent it, providing the conditions specified in the law were met, once the water owner get permission from the State.

The government's intervention in the water sector, and particularly in groundwater and Qanat systems, became formalized later in 1943, when the Independent Irrigation Agency was established under the Ministry of Agriculture. The establishment of this organization marked a historic moment in Iran's system of water governance. It finally shifted the governance of groundwater and of the Qanat systems from the local level to the national level.¹⁹ In other words, this represented another piece of the puzzle that had a modern nation state as its final picture.

As societies modernized, more "efficient" methods of water supply and distribution were developed, such as pipelines, pumps, and reservoirs. Modernization was never only about adopting an economic system or a vision of property: it was about desire.²⁰ As social scientist René Girard put it, mimetic desire defined the feature of political modernity, that is, there could not be any top-down modernization processes without the creation of specific mimetic bottom-up desires.

New technologies and new water demand and desires made Qanats less necessary for water access. They could not fit the mindset of a modern society. Increasing population put in fact greater demands on water sources, and Qanats seemed unable to provide sufficient water for growing communities. During the second half of the twentieth century, Iran turned from a rural country to an urban country. Shifts in climate and land use, such as deforestation or urbanization, altered the hydrology of regions; moreover, maintenance of Qanat systems requiring significant effort has been neglected, leading to their decay.

18 Beaumont, P. (1974), "Water Resource Development in Iran." *The Geographical Journal* 140 (3): 418–31.

19 Ardakanian, R. Mojtaba N., Iwan N., Seyed H. (2010) "Institutional Capacity Development of Water Resources Management in Iran" M. Blokland, G. Alaeerts, J. Kaspersma, M. Hare (eds.), "Capacity Development for Improved Water Management", Boca Raton, FL: CRC Press, 179–199.

20 Girard, R. (1990) *Deceit, desire, and the novel: Self and other in literary structure*, John Hopkins University Press, 1990.

In 1962, the Land Reform Law was introduced, and it was put to a national referendum in 1963. It was the most important of the 19 national legislative reform programs collectively known as the White Revolution of the Shah.²¹

The Land Reform Law redistributed lands owned by feudal landlords to poor rural peasants. It also changed the way infrastructure was maintained, from the previous system, where exploitive feudal landlords, or ‘khans’, bore the sole cost of Qanat maintenance, to a system where the cost of maintaining water infrastructure was shared between the many small-scale farmers and the former landlord. As a result, ‘peasants’ were transformed into ‘farmers’ and had to negotiate the difficulties of water supply with former landlords, but in a totally different cultural milieu. This system of ownership negatively affected the dynamics of interaction between stakeholders at the local level, because there was no other power recognized by the farmers or the community, as in traditional Qanat societies, apart from the power of sole ownership.

In many situations, the new land reform (which was little concerned about water reform) led to conflicts between the stakeholders which led them to abandon the Qanat and their land entirely.

On fertile lands, however, the new small-scale farmers succeeded with the help of new water resources provided by deep wells that were more cost-effective than the Qanat systems – though on many alluvial plains the superficial aquifer was also tapped by shallow wells. Between 1966 and 1978, a number of laws were passed to limit some of the adverse impacts of development on natural resources, especially groundwater, including the Groundwater Resources Preservation Act, the Water Law, and the Manner of Water Nationalization. The concepts and terminology introduced and used in these laws later became the basis of groundwater management. For example, the key concept of *dasht-e mamnooe*²² (prohibited area) is defined here for the first time.

21 To know more about the complex top down “White Revolution” that led to the Islamic revolution of 1979: Ramazani, R. K. (1974) “Iran’s ‘White Revolution’: A Study in Political Development.” *International Journal of Middle East Studies* 5(2): 124–39.

22 “Dasht-e Mamnooe” is a Persian term that translates to “Forbidden Zone” in English. It refers to an area or space that is off-limits, prohibited, or restricted for various reasons. These reasons can include legal, safety, security, environmental, or cultural considerations. Dasht-e Mamnooe can be applied to physical locations, such as restricted military zones, private property, or protected natural areas, where access is forbidden to the general public. The concept of Dasht-e Mamnooe can also be extended metaphorically to refer to certain actions, behaviors, or topics that are considered taboo or socially unacceptable within a particular culture or society. In such cases, engaging in these forbidden actions or discussing these topics may lead to negative consequences or social stigma. Overall, Dasht-e Mamnooe highlights the idea that there are boundaries and limitations in both physical and social contexts that individuals are expected to respect and not cross.

It introduced a hydrogeological equation to guide policymakers in legislating the issuance of well-digging permits. Dasht-e-mamnooe became the cornerstone of a series of regulatory policies (including banning wells) to control over abstraction and restrict access to groundwater. However, the regulatory policies associated with this term have largely failed to control water abstraction at the local level, as clearly demonstrated by the soaring numbers of both prohibited plains and drilled wells over the ensuing four decades.

In 1983, in post-revolutionary Iran, by the ‘Law of Fair Water Distribution’ (FWD), the new basis of Iran’s water policy, an attempt to change the legal, political, and economic structures of water management in the early years following the revolution was mainly driven by a strong belief that poor and marginalized people (the *mustazzafin*) had been overlooked by the previous government. The laws crafted and approved under the previous Shah’s regime were largely perceived and framed as anti-farmer and anti-poor laws.

The FWD law was passed in order to send the message that groundwater is common property and belongs to the nation, not just to those with enough money to drill deep wells. To put the law into practice, the Ministry of Energy issued abstraction permits, allocating water to different sectors and provinces. The new law repealed the former definition of *dasht e mamnooe* and devolved to local water authorities the power to decide whether water abstraction in a plain was forbidden or not. Through this law, the parliament also urged the government to issue permits for the unlicensed deep wells that were dug during the early years of the revolution (1979–1983). One of the main rationales for issuing permits was to promote fairness of access to water. Another presumption was that by issuing licenses and registrations, the new government could expand its influence and control over the entire territory, and limit illegal wells.

Despite their long and important history, the role of Qanats in Iran’s water management and provision was finally undermined by the FWD law. Since the second half of the twentieth century, most of the Qanats have been replaced by motor pumps and modern irrigation schemes.²³

The advent of modern nation-states and the new trading needs of an ever more globalized Iran, together with new modern ideas and life styles, profoundly affected people’s livelihoods, as well as their relationship with water and Qanats as a sustainable system of water management.

As cities became megalopolis, rural areas were abandoned and Qanats were often left aside.

23 Beaumont, P. (1968):“Qanats on the Varamin Plain, Iran.” Transactions of the Institute of British Geographers, no. 45 169–79.

The social institutions that evolved through history to support Qanat systems also become redundant, losing its social functionality.

Iran has constructed numerous dams and reservoirs to manage its water resources, since the revolution. These structures are used for water storage, hydro-power generation, and irrigation, but also for leisure: it is the case of Chitgar artificial lake, situated in a residential, luxurious area in the North of Teheran, where housing costs went extremely high because of the presence of the lake.

Water distribution networks and infrastructure are managed by regional water organizations. These organizations are responsible for supplying potable water to urban areas and allocating water resources to agricultural regions. But since agriculture is a significant consumer of water in Iran, the last decades have experienced the diversion of numerous streams and rivers to allocate water to agriculture.

It is the case with the Zāyanderūd river, along which the city of Esfahan has flourished from the sixteenth century and which has now disappeared.

Iran has been gradually moving towards a more market-based approach to water pricing to encourage efficient water use. Subsidies on water have also been reduced to discourage wasteful consumption.

Due to water scarcity in some regions, Iran has invested in desalination plants along its coastline to provide a source of freshwater.

Today Iran faces significant water management challenges, including droughts, over-extraction of groundwater, and inefficient water use practices. Climate change has also exacerbated these issues.

Iran shares water resources with neighboring countries, leading to international agreements and disputes over water rights, such as those related to the Caspian Sea and shared rivers.

Prolonged periods of low precipitation have led to decreased water availability in rivers, lakes, and reservoirs; a sustainable water provision which lasted centuries, like the Qanat, was substituted by a modern and predatory water extraction: this is contributing to the water challenges that the country is facing now and will face more significantly in the future.

4 Conclusions

Iran has been heavily reliant on groundwater for agriculture and drinking water. The shift from a complex system such as that of Qanats – which entailed a specific water culture and organization – into a modern, state-centered water extraction provision has had a dramatic impact on water resources of the country.

Qanats developed because underground water represented a solution for water provision in arid areas. However, water demands and community organization

around water dramatically changed in the last two centuries, driven by a historical, economic and cultural push identified as Modernization.

This process did not only bring about new ways to conceive property and ownership. It also deconstructed traditional balanced entanglements made up of human subjects, technological knowledge and hyper objects such as the environment.

Somehow, the disentanglement of the whole led to unbalanced growing communities in urban settings, a centralized technological knowledge and hyperobjects that are alien to human subjects.

In the last decades, over-extraction of groundwater has led to the depletion of aquifers and land subsidence in different areas of the country, which is a relatively new situation, if we consider the long history of civilization in the Iranian Plateau.²⁴

Pollution from industrial and agricultural activities has degraded water quality in many parts of the country, making water sources unsafe for consumption and irrigation.²⁵

Political instability and economic challenges at various points in Iran's history have also affected the ability to invest in and implement effective water management strategies. Iran has experienced periods of extended drought and variability in rainfall throughout its history, which have contributed to cyclical water scarcity. However, water scarcity has never been so severe as it is now.

While the country has made efforts to address this issue of a more sustainable water provision through infrastructure development, policy changes, and water conservation measures, the complex nature of the crisis continues to pose significant challenges. Nowadays Qanats are recognized as UNESCO²⁶ world heritage; it is possible to visit several Qanat museums in contemporary Iran. However, while it is somewhat interesting to see how past civilizations were advanced in their adaptation to a certain environment, it is striking to become aware of how present day, hyper technological civilizations are meant to fail what our ancestors have succeeded: surviving. This is in fact one of the basic principles underlying the modern idea of sustainability.

24 Karamidehkordi, E. *A Country Report: Challenges Facing Iranian Agriculture and Natural Resource Management in the Twenty-First Century*, Human Ecology 38, no. 2 (2010): 295–303.

25 Sowers, J. *Water, Energy and Human Insecurity in the Middle East*, Middle East Report, no. 271 (2014): 2–48.

26 “The Persian Qanat system is an exceptional testimony to the tradition of providing water to arid regions to support settlements. The technological and communal achievements of the Qanats play a vital role in the formation of this civilizations.” (UNESCO nomination of the Persian Qanats 2016.