

# Environmental Issues in the Middle Islamic Period (ca. CE 915-1517)

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Yehoshua Frenkel\*  
Haifa University

*This study presents succinctly medieval Arabic accounts of landscape, water supply, nature and natural hazards. This data enables us to reconstruct humanity's efforts to make use of natural resources and its reaction to calamities. The sources cast light on governors' engineering efforts in support of farming, as well as their reaction in periods of shortages. The political implications of famines encouraged them to carry out a moral economy. Affluence enhanced their image as virtuous rulers. Reports on constructions of granaries and supply of cereals illuminate these political dimensions of rudimentary environmental policy. Contemporary Muslim thinkers and politicians often highlight these historical accounts in order to support arguments about an Islamic ecological agenda. Their suggestion can serve as a starting point to an emic discourse regarding modern times climate challenges.*

**Keywords:** *Idea of nature; Water engineering; Food supply; Natural hazards*

## INTRODUCTION

During the recent decades scholars are paying growing attention to environmental history. This methodological turn also reshaped the study of the Islamic history (Davis and Edmund Burke III, 2011/Baron and Daim, 2017/Izdebski and Mulryan, 2018). The Islamic caliphate (634-1517) that ruled over Western Asia and the Southern Mediterranean was a conglomerate of a different eco-systems and walks of life. It governed sophisticated urban centres, villagers and nomads. An environmental observation adds to our efforts in reconstructing and interpreting its history.

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\* Department of Middel East and Islamic Studies, Haifa University, Haifa, Israel.  
frenkely@research.haifa.ac.il

The present brief essay focuses on humanity's efforts to use natural resources and on natural hazards' effects on historical developments in Islamic Near East during the pre-modern centuries. I will open with a concise piece on the vision of nature, cosmos, human landscapes (cities and roads) and water resources, and will conclude with natural hazards.

### *Nature*

The idea of nature and environmental consciousness are Western neologisms, although modern Muslim authors would often refer to the Qur'an and Hadith, arguing that these sacred texts clearly reflect awareness to these concepts (Dien, 1997). Yet, although these abstract terms are missing in the Pre-Modern Arabic documentation studied by me, nevertheless this does not negate the fact that historical sources provide ecological data, including accounts of natural resources. These sources narrate on landscape (physical environment) and on living organisms (zoology) (Ibn Abī Ḥajala, 776/1375). They report about topography, climate, fauna, flora and related topics. Moreover, in those texts we read on efforts aimed at harnessing natural resources.

Nevertheless, most of the historical environmental data that is at our disposal narrates various negative aspects of nature impact on society, namely about hazards: earthquakes, floods, plagues etc. Reports on the effects of the Black Death on animals can serve as an example to this point. Telling on the spread of a plague in Egypt, the contemporary historian al-Maqrizī says:

*“During the last days of the month (February 1430) a great number of dead fish and crocodiles were found in the Nile River and ponds in Cairo. The carcasses were floating on the water. A great number was grabbed. Their colour was deep red, as if they were painted with blood. In the region between Cairo and Suez many carcasses of gazelles and wolfs were found (...) In some garden of Cairo seven wolves were found that had died of the plague. And a man had four chickens that died and at the region of the stomach of each of them swollen lymph nodes was found. And a man had a long tailed small monkey (nasnāsa) that was hit by the plague in its head” (al-Maqrizī, 845/1441, 4/2: 825, 829).<sup>1</sup>*

### *Cosmos*

Muslim geographers informed their audiences on the structure and shape of the universe. These accounts included description of the cosmos, animals, plants and minerals. An example to these writings can be obtained from al-Maqrizī's works (Stowasser, 2002). In a short treatise entitled *al-Maqāsid al-saniyyah li-ma'rifat al-aḡsām al-ma'diniyyah* he deals with the classification of minerals, their medicinal uses and theories of their coming into being. This treatise depends almost exclusively on al-Qazwīnī's and Ibn Faḍlallāh al-'Umarī encyclopaedias. The contents of their chapters on minerals can in turn be traced back to the early Arabic natural philosophers and their Greek precursors.

As early as the Abbasid era Muslim scholars deliberated the story of creation and the structure of the universe (al-Aṣḥabānī, 369/979).<sup>2</sup> This line of enquiry was continued by later generations of Muslim thinkers. Ibn Qayyim (Livingston, 1971) believed that the structure and harmony of the universe, and of the earth's routine, with its four seasons, its moon and sun winding around their celestial belts, were God's gifts to man. They are like a drip in the ocean (*qatra fī baḥr*). The sun nourished plants and animals for man's sustenance and measured his years and days. By them he reckoned religious feasts and proper times to pray. The stars were the traveller's nightly guideposts. The earth, with its elements of fire, water, air and soil, its seasons, seas, mountains and winds all in perfect balance, formed a well-built and furnished home.

A devoted Muslim, Ibn al-Qayyim based his vision of the universe on the Qur'an (Ibn Qayyim al-Jawziyya, 751/1350, 561-567). A similar approach can be observed in al-Suyūṭī's concise booklet on the creation and the galaxies formation (Suyūṭī, 911/1505). A third medieval chronicler opens his compilation by quoting the verse "He created the heavens without any pillars you (can) see",<sup>3</sup> and continues by elaborating:

*"standing, and holding them lest they fall to the earth, so by His power, they are eternal, staying, spreading the earth over the water, parting it into lower and upper, rugged and soft (...). The earth is 24,000 parsangs, 12,000 for the Blacks, eight for the Byzantines, three for the Persians, and one for the Arabs. Yahyā b. Kathīr said: God created 1000 communities (umma), then caused 600 of them to inhabit the sea, while 400 inhabited the earth, but God knows best" (Ibn Naẓīf 650/1250, 1a-2b).*

A parallel point of view can be deduced from compilations on "the Wonders of Creation ('*adgā'ib*)" (Schimmel, 1994, 2003). Looking into pre-modern Muslim societies it is evident that the distinction between supernatural and natural is somewhat anachronistic. The narration of oddities (*al-ghara'ib*) produced in that realm aimed at providing the Muslim audiences with accounts of God's omnipotent power and His divinely ordered cosmos.

The purpose of these writings was to induce wonder at God's creation and the order of the cosmos. Wonders include all of creation, whether common or rare: the stars, mankind, animals, earth, as well as the invisible creatures. Authors who contributed to this genre emphasized thereby natural wonders, many of which are familiar oddity (*al-ghara'ib*). These are any wondrous matter which occurs rarely and is contrary to what is commonly known: eclipses, asteroids, snowfall out of season, earthquakes, smoke that rises from the earth, the births of animals with strange forms, such as conjoined twins, as well as the evil eye or the unique characteristics of unusual souls (Berlekamp, 2011).

The story of al-Khaḍīr (al-Khḍīr) illuminates the common belief in the visible and the unseen cosmos. Mamluk period audiences believed that he was blessed with

long life and acutely did not die (Omar, 1993). They openly received the sagas that he buried Adam and accompanied Moses, in a journey to the junction of the two seas. At that remote place he discovered the source of life, a location that later on was visited by the Two Horn Alexander.<sup>4</sup>

The belief in some venerated caves and trees was not rare. Moreover, it seems that in some occasions, natural object (trees) served as a vehicle transmitting appeals (Dafni, 2006). They were used as foci of invocation or as board to hang upon it dust cloth or torn pieces (Ibn Taymiyya, 728/1328, 29). Al-Bakrī al-Ṣiddīq tells that “We visited there our master al-Mufaḍḍal, over whose grave there grows a carob tree. We ate of it hoping for a blessing and a healing from sadness and woe” (Anabsi, 2008).

### ***Human Landscapes: Cities Roads and Bridges***

Although it was stated above that pre-modern Arabic sources were not familiar with the idea of nature, it does not mean that they did not pen geographical descriptions. Al-Muqaddisī, for example, says: “The town of Baniyas is situated on the border of al-Hula Lake, towards the foot of the Snow Mountain (Hermon). An Extremely cold river gushing under it issues a spring in the middle of the town; The region of al-Hula produces much cotton and rice; Along the Hula shore is a thicket of sedges (*ḥalfā*; reed); in its water are numerous kinds of fish, especially that called Bunni (Binni)” (al-Muqaddasī, 378/988, 160-162).

Ibn Fadl Allah al-ʿUmari wrote that: “Beirut is a coastal fortified town. In its province is a mountain with iron ore quarry. There is a forest (*ghayta*) of high Stone pine trees (*ṣanūbar*; *Cedrus Libani*?) that covers a long region up to Mount Lebanon”. In springtime, al-ʿUmari adds, the town of Homs (Emesa) is surrounded by endless fields of Chrysanthemums and Daffodils flowers. Nearby is a pond with fish and birds are scattered around (Ibn Faḍl al-ʿUmari, 750/1349, 3: 363, 365). Volume 20 of his encyclopaedic compilation is devoted to zoology and botany. The data is arranged in Alpha-Beth and often refers to earlier works, visible among them is Ibn al-Baytar (593-646/1197-1248). Description of wild beasts can be found also in other literary genres. Those for example in Usama ibn Munqidh’s “memoires”. Among the bests of prey encountered by him in Syria were lions and leopards. He describes in great details the distinction between leopards and cheetah (Usama Ibn Munqidh, 1188).

Long before the emergence of the Islamic caliphate roads connected imperial centres in the Near East. The new rulers used these networks and added new one. Pavement of roads and construction of bridges over streams provide evidence to environmental challenges. Facing a difficult landscape demanded geographical and topographical knowledge and engineering skills. The Umayyad Road from Damascus to Jerusalem can serve as an example to the point. Dated from the years of ʿAbd al-Malik reigning several milestones have been discovered. Some of them marked routes in Syria and Palestine. In the shallow water off the southern shore of the Sea of Galilee a gray basalt stone carries the inscription: “The commander of the Faithful has ordered the levelling of this difficult pass” (Sharon, 1966/Elad, 1999).

Close to this site, at Sinnabra, a bridge over the Jordan River was used by travelers. A siphon pipeline provided water to the site (Greenberg et al, 2014).

The Mamluk sultan Baybars executed a resembling policy. He paved roads from Cairo to Northern Syria and built several bridges (Silverstein, 2007/Cytryn, 2010). Other sultans also paid attention to the strategic need of fast travel from the center to the frontier (Raphael and Amitai, 2023). This collective military effort, the planning and constructing of infrastructures, reflects, as was already said above, an environmental and technical knowledge. Narrative sources (chronicles, travelogues, geographical writings and chancellery manuals), as well as archaeological studies arches cast light on the 'Abbasid and Mamluk postal network (*al-barīd al-manṣūrī*) (Franz, 2021).

### **Water**

The environment of the Eastern Mediterranean basin supported an agricultural way of life. "Egypt is the Gift of the Nile", said Herodotus, referring to the irrigated (*rāy* or *siqāya*) intensive farming of the Nile Valley. And indeed Egyptian chroniclers would regularly report on the level of the Nile River, which was measured by the Rawda Nilometer (Creswell, 1932/Borsch, 2000). Bilad al-Sham is a dry farming region. Farming in this vast territory was based on winter rains (*ba'ḷ*). Artificially irrigated farming was restricted to vegetable gardens and beds (Braemer et al, 2009/van Bavel et al, 2017). Reports on 'Abbasid taxation uphold this historical vision, as do Ottoman cadasters (*daftar*). Disturbance of this way of life was caused by draughts and floods. Their heavy toll is reported in the narrative sources. So are also reports on Bedouins' raids.

Water engineering demonstrates environmental knowledge (Hill, 1993/Edmund Burke III, 2009). Canals had to be dredged regularly throughout to keep irrigated water flowing in the countryside and consumed by inhabitants of urban centres (Levanoni, 2008, 2021). An early Islamic period example is the qanat/falaj system (English, 1968/Goblott, 1979/Lightfoot, 1997/Abudanh & Twaissi, 2010). These were underground tunnels that collect fresh groundwater and transporting it by gravity flow from a source (aquifer) to remote fields (surface) facilitated intensive farming. The origins and spread of this technique have been debated among scholars (Avni, 2018). Here I would highlight its spread during the Umayyad period (650-750) (Rayne, 2020). Dozens of archaeological publications cast light on it (Nol, 2015 Gorzalczany, 2021). The prevailing idea is that the new rulers used the human resources under their control to implement new technologies (Iranian?) in northern Arabia and in Bilad al-Sham (Brown and van Berkel, 2024).

Nevertheless, even if the qanat were introduced only with the Umayyads, other systems to supply drinking water and irrigate fields were well-known in Bilad al-Sham long centuries prior the emergence of the Caliphate. Open canals and tunnels were used in various towns and villages. Damascus and Jerusalem, for example,

depended on remote sources that brought water to the heart of the city (Shoshan, 2011; Frenkel, 2022). In villages pipes supplied water to gardens (Walker, 2017). Nasir-i Khusraw describes the roofs of Jerusalem and the collection of rain water (Nasir-i Khusraw, ca. 1088, 27).

The agro-economic book on “The Nabatean (i.e. pre-Islam) Agriculture”, which is ascribed to Ibn Wahshiyya (d. 318/930) (Hämeen-Anttila, 2006) contains a section (chapter on contriving water and its engineering) on water and irrigation (Ibn Wahshiyah, (318/930). It deals with visible sources and underground sources and provides guiding lines “how to dig water wells”. Civic projects (*siqāya*)<sup>5</sup> to provide water to men and animals was regarded as a fulfilment of religious duty.<sup>6</sup> Along the roads and streets fountains (*sabil*) supplied water. In a great number of cases these water installations were supported by pious charities (*waqf*). Some of these endowment deeds mention the function of water carrier (van Berkel, 2017, 2022). Another example is provided by lines on “the construction of a pool in the land of Hebron for the pilgrims who were coming and visitors” (Ibn Furāt, 807/1405, 120).

Water was used also as a source of energy, as can be deduced from watermills’ ruins in Bilad al-Sham (Boyer, 2024). Woods were another natural resource that was widely utilized by all. They were prime source of energy and manufacture. Timber was used in building construction and boats’ manufacture. Furniture is another craft that demented woods (Sadan, 1976). Reports on expedition from Mamluk Cairo and to Anatolia import documentation illuminate it. For cooking and heating firebrands were used (Levanoni, 2005). Burning oil served to brighten the dark nights. Findings to support this deduction can be seen in many museums worldwide (Sussman, 2017).

Data on medieval Islamic animal breeding can be extracted from medical writings. Housni Shehada’s study of Mamluk veterinary medicine (*bayṭara*) (Shehada, 2013) provides a solid introduction to this genre. Epistles and hunters’ guides mention predatory animals (*dawāri* i.e. leopards) and hunting animals (*jawāriḥ*; i.e. dogs)<sup>7</sup> and goshawk (*bāz*) (Ibn Fahd al-Ḥalabi, 725/1325, 347-349). The sultan Baybars organized a large-scale blood-sport expedition in the forests of Arsuf (Sharon) to hunt lions (*al-sibā’*) (Amitai, 2005).

Caliphs and Sultans invested in gardening (Pradines and Khan, 2016). Traversed by water canals, the urban green space functioned as a *jardin de plaisance* (Rabbat, 2004). In his encyclopedia of Cairo (al-Khitat) the Mamluk historian al-Maqrīzī includes informative material about gardens (*basatin*) and urban landscape (Behrens-Abouseif, 1992). The contemporary historian Ibn Iyās reports that the sultan Qānsūwh) al-Ghawrī fashioned a marvellous artificial environment (916/ December 1506 to January 1507). He obtained from Syria a remarkable load of trees and flowers, which included Syrian apples, pears, Syrian quinces, sorb-apples, grapes, coconut, roses, lilies and other Syrian flowers. They were planted in the lower hippodrome of Cairo (Ibn Iyās, 930/1524, 4: 102, 172-3, 176-7).

### ***Environmental Hazards***

The previous paragraphs aimed at providing a succinct account of environmental perceptions of pre-modern Near Eastern society. This section concentrates on perils. Natural hazards mediated the close connection between humans and the environment. No doubt that narrative sources and other literary genre compiled by that society contain numerous reports on natural hazards (tribulation) (Frenkel, 2014). These texts (chronicles and official dispatches) inform on destructive forces (Büssow-Schmitz, 2017), flash flooding, droughts, bitter winter, snow, epidemics, earthquakes (Guidoboni & Comastri, 1997/Daiber, 2017), tsunami (Amiran et al, 1994/Guidoboni et al, 2004/Daiber, 2017), fires (von Hees, 2017/Frenkel, 2019), pest etc. They exacted heavy toll (Frenkel, 2014).

Estimations of natural hazard impact on economy and demography are beyond the boundaries of the present study. It is sufficient to highlight the assumption that the Black Plague (1347-1350) (Borsch, 2017) was a historical turning point, and that the region did not recover from its devastating sway for long centuries. As regarding social reaction to massive death and destruction we assume that fear from natural hazards caused social tension. Reports on attacks on non-Muslims (*Ahl al-Dhimma*) illuminate this harsh reality (Akasoy, 2007). A case to the point is Ibn Kathīr's account of arson in Damascus (in 740/1339). He narrates that a group of Christians made contact with two monks who were disguised as Muslims. The two men are described as laying a fire that destroyed the south-eastern minaret of the Umayyad Mosque and causing another fire in the bow market (Bosanquet, 2020).

Yet, in light of the opening lines there is place to a brief account of common theological explanations of natural catastrophes. Muslims in the lands hit by natural hazards searched for explanations. They provided a mixed reaction, to what they considered as tribulations. Earthquakes was described by them as resulting of vapour produced from subterranean water (Akasoy, 2009). The causes of this was explained by a theological interpretation: divine punishment lashed against Muslim who committed vices (*munkirat* i.e. homosexuality and fornication) (Akasoy, 2007; Esmeir, 2020).

It seems that the prevailing view among Muslims in the time and spaces studied here linked natural disasters as divine will. This gave rise to social debate about reaction to catastrophes: should the believer stay in place or would he flee from his location. As about those who met their death in plague, fire or flood it is commonly accepted that they are martyrs.

Shortage in supply and rising food prices instigated reaction by Muslim jurists, who debated the potential intervention in the market and fixing of prices (*tas'ir*). In his manual of the market inspector, Ibn Taymiyya wrote that hoarding is unlawful, since it constitutes illegal gain (*riba*). This position reflected his basic position regarding the market. He argued that the government (*muhtasib*) should not intervene in trade and that prices (*si'r*) should be negotiated between merchants and customers. Yet in case of supply disruption and scarcity the government can interfere and fix prices (Ibn Taymiyya, 728/1328, 21, 30-32).

## CONCLUSION

The present short contribution opened with an inspection of medieval Arabic writings on nature. It offered a handful accounts that establish the use of water and fire as sources of energy. The second section presented references to natural hazards and their consequences. It is evident that no administrative department (divan) was in charge of recording these calamitous events, although provincial controllers regularly reported to the centre on damages and costs of lives. Moreover, prior to the Ottoman renewal efforts no disasters management is recorded.

## NOTES

- 1 But see Andre Miquel, (1975), (who under that noun describes a bird (Chevalier); Jomard.
- 2 Kamāl Abū Dīb (Abu Deeb) studied a booklet with a similar name, *al-Adab al-'ajā'ibī wal-'alam al-gharā'ibī fī kitāb al-'Azamah wa-fann al-sard al-'Arabī* (Beirut, 2007). Yet, it is a different compilation.
- 3 Qur'an, 31:10.
- 4 Qur'an, 18, al-Kahf: 60-82; Ibn Kathīr, 774/1373, 2: 250, 258; Ibn Ḥajar, 852/1449).
- 5 A review of Wittfogel, *Oriental Despotism*, is beyond the boundaries of the present study.
- 6 Qur'an 76, al-Insān 5: "Surely the pious shall drink of a cup whose mixture is camphor, a fountain whereat drink the servants of God, making it to gush forth plenteously". This verse was often inscribed of drinking fountains.
- 7 Qur'an 5, al-Mā'ida: 4 "The good things are permitted you; and such hunting creatures as you teach, training them as hounds, and teaching them as God has taught you-eat what they seize for you, and mention God's Name over it".

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