

# Biological disasters and epidemics in the Arabian Peninsula: a review

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**Abstract.** The objective of the present article is to observe the disasters, especially of biological nature, and epidemics, occurred on the territory of the Arabian Peninsula, to define and classify their peculiarities and impacts on population, social system, ecology and environment as a whole. The definition and classification of disasters are given, provided is the statistics on epidemics that occurred in the Arabian Peninsula and their impacts on environment are recognized. The economic impacts leading to changes in ecosystems are shown. The geographical peculiarities of the studied region and their interrelation with disasters impacts are identified. The history of the development of ideas on ecology and environmental science in the Arabian Peninsula and its connection with the development of Arabian civilization are reviewed in the article.

## 1 Introduction

Throughout historical times, humanity has suffered from challenges that threaten its survival and continuity on Earth; however, his instinct for survival has driven him to struggle to overcome these challenges and even find solutions that align with the times he lives in and the available resources. Natural disasters and epidemics are among the most significant challenges humanity has faced, as they result from divine will. In ancient religions, people regarded them as a form of punishment from the gods due to their anger. Therefore, this phenomenon was linked to the religious aspect of ancient human life, as evidenced by historical texts and confirmed by archaeological and anthropological studies that have provided records of epidemics and their relation to the anger of the gods, presenting them as punishments for humankind.

The study aims to provide statistics on the disasters and epidemics that occurred in the Arabian Peninsula and to recognize their impacts on the social system of that time. The research structure consisted of two sections, an introduction, a conclusion, and a list of the most important sources and references used. The first section focused on defining the nature of disasters and epidemics, clarifying their concepts and history. The second section was titled: Disasters and Epidemics before Islam and was divided into two axes. The first axis addressed the types of disasters and epidemics (a study of models) and selected specific examples of some disasters and epidemics that struck the Arabian Peninsula in ancient times. The second axis discussed: the impact of disasters and epidemics on life in the Age of

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Ignorance, highlighting their effects on the social system in its various religious, social, and cultural forms.

The topic of disasters and epidemics is among the important subjects that have occupied the minds of researchers and historians, leading to numerous writings and the presentation of various scientific studies. However, these works have not specifically focused on the history of the Arabs before Islam, but rather most of them addressed Islamic eras or the history of the ancient East in general, with only implicit references to the history of the peninsula. Among the prominent studies on the subject is:

Epidemics and Catastrophes in the Ancient Near East, by Mohammed Marqatan, 2021.

This study addressed most of the disasters and epidemics that plagued the ancient world and dedicated a small part to the subject of the research. The researcher relied on a descriptive approach in the study and indicated that most of the disasters that occurred in the peninsula before Islam were due to natural phenomena and their effects. Through this study, it was concluded that religious thought had a clear impact and direct influence, as these phenomena were attributed to the anger of the gods and, consequently, the anger of nature towards humans.

## 2 Methods

### 2.1 Definition of Disasters and Epidemics

Disasters, in language, is the plural of the word " karithah ", derived from the triliteral verb (karith) which means to harm or cause severe difficulty (Ibn Manzur, n.d., article on " karith'. In terminology, there is no unified definition describing disasters; instead, various definitions have been attributed to them based on the impact of the disaster itself and its temporal effects. Sometimes, disasters are defined as: an event that results in significant losses of life and property while causing environmental pollution and can be intentional or unintentional, which necessitates efforts to confront it and mitigate the resulting losses. It is also defined as: a sudden and unexpected change in the general way of life due to natural phenomena or human-made actions that, in turn, result in considerable damages and may lead to loss of life and substantial material losses. The International Civil Protection Organization defines disasters as significant losses of life and property, which can be natural due to natural forces such as earthquakes, floods, storms, and volcanoes, or can be industrial resulting from a specific human act that may be intentional or deliberate, requiring governmental and private assistance to respond to them [1]

From these definitions, there is a near consensus that disasters are natural phenomena, even if humans play a role in triggering them; they are fundamentally a result of nature. Given the active role humans also play in the occurrence of disasters, it is necessary to categorize this phenomenon to understand its details and delve into its content. Disasters are generally divided into three main types [2] represented as:

Firstly: Natural Disasters: which originate from divine will and are not influenced by human action; they are further divided into various categories which are:

- Climate disasters: such as floods, storms, hurricanes, droughts, and aridity.
- Geological: or what is called tectonic because they relate to formative factors concerning the Earth's surface and its rocks, including earthquakes, volcanoes, and tidal waves.
- Biological: representing epidemics and infectious diseases at the levels of plants, animals, and humans as well.

- Cosmic: such as the fall of meteors, shooting stars, and cosmic rays.

Secondly: Human-made disasters: which are man-made and are divided into:

- Planned intentional disasters: such as wars, weapons, and deliberate fires.

- Unintentional disasters: where human negligence is the main and effective factor in their occurrence, such as landslides.

- Hybrid disasters: which are shared between human intervention and nature, starting with human actions and where nature is the main axis in their development and increased impact, such as fires that the winds help spread and earthquakes that see increased losses due to crowding among individuals and a lack of awareness in handling them [3].

As for the term epidemic: it has appeared in the language to mean the corruption that affects the essence of the air for celestial or terrestrial reasons, as some mention [4], where it is stated: "Earth and epidemic, its diseases are many; and it has epidemics if its diseases are many"[5].

An epidemic, in terminology, refers to a disease that affects many people in a specific area of the Earth, unlike common diseases in terms of abundance and spread [6]. The epidemic is mentioned in the Holy Quran in specific surahs with indications of the causes that led to its occurrence. Tafsir books indicated that the most prominent epidemic is the plague [7].

As I indicated in the introduction, the first section deals with the types of disasters and epidemics (a study of models), selecting specific examples of disasters and epidemics that struck the Arabian Peninsula in ancient times. The second section discusses the impact of disasters and epidemics on life in the Age of Ignorance, employing the effects of disasters and epidemics on the social system in its various aspects: religious, social, and cultural. However, before I begin recounting the material related to this chapter, I would like to start with an introduction to the section in which I refer to the nature and geographical formation of the Arabian Peninsula in terms of location and climate, as this is essential for forming a complete picture of the region under study..

## 2.2 The Geography of the Arabian Peninsula

The Arabian Peninsula is considered the second-largest peninsula on Earth, with an area of approximately 3,237.5 square kilometers. Since it is located amidst deserts, it forms a sort of belt surrounding the ancient world [8]. Despite being surrounded by water on three sides—the Arabian Gulf to the east, the Indian Ocean to the south, and the Red Sea to the west—this does not alleviate its harsh heat

Looking at the general map of the Arabian Peninsula, one finds it comprises elevated lands in the west that dominate the narrow coastlines, forming a chain of interconnected highlands that extend from the Levant to Yemen, known as (Al-Sarawat), which parallels the Red Sea coast, with an average elevation of about five thousand feet. Nevertheless, the desert nature prevails in the Arabian Peninsula, as it includes valleys and plains [9].

As for its climate, despite its proximity to water surfaces as mentioned, it is considered one of the driest geographical areas. This may be due to its location near the equator, with the majority lying in the hot tropical zone between latitudes 12° and 32° North, and 30° and 12° South, which results in significant daily and annual climatic variability. Meanwhile, its northern sections experience a cold, humid winter that can lead to frost in the oasis waters, and extremely dry and hot summers [10].

In general, its regional divisions are divided into three sections:

- The area of influence, which corresponds to the classic Arab desert classifications and today represents the Hijaz.

- The Al-Dahna area, which is described as rocky in classical terms and represents the Tihama regions.

- The Al-Harrah area, which is known in classical Arab classifications and today represents Yemen, Al-Ahsa, and Najd [11].

For further reference, see (Fig. 1), which illustrates the geographical divisions of the Arabian Peninsula before Islam. These divisions align with what Abu al-Mundhir Hisham ibn al-Sa'ib mentioned, as narrated by Ibn Abbas, stating: "The Arabs divided their island into five sections: 'And the land of the Arabs is called an island because it is surrounded by rivers and seas on all sides, making it resemble an island among the islands of the sea...': 'Thus, the land of the Arabs from this island where they settled and multiplied is divided into five sections according to the Arabs in their poetry and history: Tihama, Hijaz, Najd, Al-Ahsa, and Yemen' [12].



**Fig. 1.** Divisions of the Arabian Peninsula.

It is notable from these classic divisions of the Arabian Peninsula that they correspond to the political aspect of this region in terms of independence from Greek rule and neighboring powers. More specifically, the first section is named after independence, the second is close to the Romans and then under their influence, and the last section represents the desert, reaching the Euphrates River [13]. Since the Arabian Peninsula enjoyed this vital strategic location, it became a point of civilizational contact with various regions, as it connected with Mesopotamia, Egypt, and the Levant. At the same time, this geographical formation and diverse climate significantly affected the nature of life for the inhabitants of the Arabian Peninsula and influenced the variety of natural phenomena within it. The residents experienced various types of disasters and epidemics and their impacts on the social structure of the population, which we will utilize in the sections of this research. Before Islam, the Arabian Peninsula witnessed various natural disasters and many epidemics that devastated people and left different impacts on the social system at that time. In terms of natural disasters, the Arabian Peninsula suffered from diverse drought phases, especially in the second millennium BCE or before the second millennium, which may be attributed to the notable decline in water levels of about 27 feet over two thousand years. This decline affected the surface of the land, leading to drought [13]

Due to the limited possibilities at that time, the most suitable solution to overcome these disasters was to leave the area affected by a natural catastrophe or an epidemic. The wealthy and well-off would flee from crowded places to more distant ones, resorting to deserts to keep away from the infected. As we mentioned at the beginning, these disasters were fundamentally attributed to the anger of the gods towards people, as perceived by the Arab mindset during the pre-Islamic era, and that evil spirits could inflict harm upon the body through food, drink, and various types of pests and insects. People thus sought to appease the gods by offering sacrifices and vows [13]

Similarly, the floods that struck the Arabian Peninsula, specifically the south, were considered some of the harshest natural disasters, characterized by numerous sudden torrents, especially the flood of the Aram, which resulted in the collapse of the Ma'rib Dam in the 6th century BC. The consequence was the loss of vast areas of orchards and agricultural lands, due to the flatness of the land rather than its mountainous terrain [14]. Likewise, historical sources indicate that these collapses were primarily due to earthquakes that struck the region, without specifying their historical periods [15]. Yemen witnessed some epidemics, as indicated in the inscriptions which reported people's flight from infected land to safe areas to escape the epidemic. A textual reference in the Musnad mentions a person named Muhammad who thanks the deity (Ta'alab Riam) for granting him health and healing from an epidemic that had struck in Hawazin and Sahrat. Additionally, over a hundred Sabaeen inscriptions related to offerings and sacrifices were discovered in Mahram Bilqis, near the city of Ma'rib in eastern Yemen, indicating some disasters and epidemics that afflicted the ancient Yemenis and their offerings to the deities afterwards.

Their healing from those epidemics is evidence of their gratitude for being saved from those diseases. What is important to us in these inscriptions is that they mentioned the names of some epidemics that swept through southern Arabia before Islam, including "Awas," which indicates the Justinian plague that struck Yemen in 549 AD, as inferred from the inscription of King Abraha, which he created during the celebration of the restoration of the Ma'rib Dam. He clarified, as part of the restoration, the health situation of the city that was afflicted by the epidemic and plague when they began the restoration work on the dam, which led Abraha, following the outbreak of the epidemic, to permit the Ethiopians and Himyarites to return to their homes to avoid the spread of the plague. Other mentioned epidemics include "Maut," "Khabbat," and "Khamat," which means in the Sabaeen inscriptions (bubonic plague) [16]. It is noteworthy that the Arabs believed that the epidemic of plague was attributed to (the stings of jinn), as the jinn would stab a person, causing them to contract the plague. Thus, it was widespread in Hijaz and throughout the Arabian Peninsula, according to what is mentioned in the books of hadith, especially the account attributed to Hassan ibn Thabit about cyclones that struck Busra and Ramh and affected every palace and home in those places. It is observed that climatic factors play a significant role in the spread of epidemics and diseases; it has been noted that mountainous regions in the Arabian Peninsula and hot, humid areas are more likely to be hotspots for the spread of epidemics, especially areas known as Tihama and Hozun near the Haraz Heights [13].

Beyond the geographical environment of the Arabian Peninsula, epidemics can arise due to the prevalence of wars and the accumulation of corpses, leading to the spread of diseases. A prime example of this is southern Arabia, which was home to many diseases due to the accumulation of corpses around residential areas and water sources, causing poverty and distancing people from cleanliness, resulting in the outbreak of plague and similar diseases. Among the dangerous epidemics that attacked the residents of the Arabian Peninsula was "Al-Lensah," a type of pimple that appears on the body resembling a small lentil, but it quickly spreads throughout the body like plague, killing its host, with few surviving it. This disease was widespread in Mecca, and Abu Lahab was afflicted by it and died [13]. They would avoid those infected with the contagious disease of leprosy, which spreads black spots on the body, disturbing the condition and appearance of the limbs, and sometimes leading to the severing and falling off of limbs due to ulceration. There was also "Bahq," which is a skin disease that leaves a white mark on the affected area of the body. Another epidemic that was prevalent was measles, as well as smallpox. It is noted that Abraha was the first to be afflicted by it, and Ibn Hisham describes it as follows: "They would fall in every path and perish in every way, at every watering place, and Abraha was affected in his body, and they took him with them, his fingers falling off one by one. Whenever one fell, it would exude pus and blood for a time until they brought him to Sana'a, resembling a fledgling

bird, and he did not die until his chest split open from his heart, as they claim. Ibn Ishaq states that measles and smallpox were first seen in the land of the Arabs that year" [19]. The Arabs used the sap of trees, bitter apple and rue to treat these two diseases [13]. The environmental conditions in the Arabian Peninsula also played a role in afflicting its inhabitants with diseases, such as the fever that spread in areas with springs, swamps, and stagnant water, and similar places. Given that Arabs were in dire need of water, they would drink from it out of necessity, which led them to contract various diseases. Arab sources indicate the existence of some endemic epidemics in the Arabian Peninsula, such as malaria, trachoma, tuberculosis, and other infectious diseases [13].

As for the safety measures followed during the pre-Islamic period, they primarily included isolating the sick so that no one would approach them to avoid the transmission of disease; they would flee to faraway places, especially when an outbreak occurred [20]. Additionally, they relied on medicinal herbs to treat patients and resorted to soothsayers for spells and incantations, offering sacrifices to rid themselves of illness. They believed that if they feared a plague, they could avert it by imitating the bray of a donkey, and that the blood of kings could cure insanity.

### **2.3 The impact of disasters and epidemics on life**

Natural disasters and epidemics that struck the Arabian Peninsula left profound effects on people's lives and their communities across various levels, as follows:

- Social impacts: Epidemics and disasters created a clear change in the social system of the inhabitants of the Arabian Peninsula before Islam. Among these changes was the proliferation of migrations from the peninsula to other regions, such as Greater Syria and Iraq, fleeing from affected areas to more suitable places for living. Another point is that disasters fueled conflicts among tribes over limited resources, such as water and food, which in turn led to the outbreak of numerous wars and armed clashes, resulting in many casualties.
- Economic impacts: Natural disasters and epidemics led to the spread of economic depression due to the destruction of agricultural crops and the death of livestock. A prime example of this is the collapse of the Ma'rib Dam, which resulted in the loss of vast areas of farmland and the death of large numbers of livestock, thereby exacerbating poverty among the people and worsening social issues.
- Religious influences: Some historians believe that certain disasters contributed to the emergence of religions, as people turned to the gods seeking salvation from their afflictions. The Arabs in the Arabian Peninsula during the pre-Islamic era considered that most of the epidemics and disasters that struck them were a result of the gods' anger towards humans, who would then take revenge by afflicting them with diseases, especially when they failed to fulfill their religious obligations towards the deities. Therefore, the Arab man hastened to offer vows and sacrifices to appease the gods, attributing the illness to them. Consequently, we find that medicine was the duty of priests and religious men, who treated the sick and provided them with remedies they believed would bring healing [13].

## **3 Conclusions**

From the above, we conclude the following:

- The fragility of Arab societies before Islam, suffering from a lack of public hygiene and weak medical infrastructure, making them more susceptible to epidemics.
- A disruption in the societal system due to the contribution of epidemics to the deaths of many individuals, resulting in the disintegration of some tribes and the migration of some populations from their areas.

- Arabs before Islam did not have sufficient knowledge of how to deal with epidemics, which exacerbated their effects.
- The growth of religious thought and the deepening of humans' connection to the deities and their sanctification, stemming from the belief that these disasters and epidemics were a consequence of the gods' anger towards humans, leading to various natural phenomena.

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