

# Bedouins' Adaptation in Oman: an Indicator of Climate Change and Prehistory

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**Abstract:** *The Bedouins' adaptation in Oman is adjusted to rigorous conditions of scanty resources. Still, investigations didn't find Bedouins remains in the archaeological context since their culture is not validated by any cultural material, or tools associated with their specific culture. This paper looks into their adaptation in order to establish a reasonable conception of the prehistoric groups who occupied the same territories and environment in Oman. Predominantly, adapting to comparable environmental conditions yields parallels in ways and methods adopted by each group. To accomplish this, the paper looks into the Bedouins' occupational sites, cultural material, adaptation, and the climatic change in order to achieve an understanding of the prehistoric conditions. In addition, it weighs up the nature and influence of change in climatic conditions and its impact on human adaptation. The paper concludes that the Bedouins' adaptation offers an acceptable correspondence to prehistoric groups in Oman before 3000 BC. Climatic change must have forced prehistoric groups to either adapt or migrate in search for better conditions. Again, it presumes that since territoriality is a convention that manages the use of the meager resources. It is a functional response of an ancient cultural ecology that progressed in specific environmental settings.*

**Keywords:** *Bedouins of Oman, Adaptation, Climatic, Change, Prehistoric Groups, Territoriality.*

## Introduction

The Bedouins are those small groups who live in open deserts of harsh environmental conditions. These desert dwellers are known in many territories of Africa and Asia. They are known for their continuous movements and unsettled wandering way of life. Consequently, their name is a manifestation of their livelihood and adaptation to arid sandy places and strict conditions.

This paper casts light on the Bedouins in Oman and their adaptation. By doing so, the paper explores whether the Bedouins' adaptation can possibly offer a reasonable understanding and a perspective to the prehistoric groups who inhabited the same regions and environment in Oman. Usually adapting to similar

environmental conditions produces parallels in ways and methods adopted by each group. And this repetition has been attested among traditional groups worldwide. In reality, traditional contemporary groups have always come to aid archaeology. It is known that the archaeological evidence usually fell short to reveal all aspects of prehistoric human societies.

Inspecting the Bedouins' adaptation can possibly facilitate an analogy and hence an inference of resemblance in some particulars between the Bedouins and prehistoric groups in Oman.

It is permissible to assume that the Bedouins' region was also inhabited in prehistoric times. Subsequently, those prehistoric groups must have experienced the desert conditions and

designed their ways and methods accordingly. Therefore, the paper proposes that the Bedouins' adaptation and territoriality can possibly represent an analogy to prehistoric adaptations under the same environmental conditions.

In order to meet these inquiries, one needs to search the process of adaptation, territoriality and the factors that compelled migration, residency and settlement in a particular environmental region.

It is tempting to raise and contemplate questions such as whether the prehistoric groups who inhabited these regions were the Bedouins' Ancestors? Or were the Bedouins emigrants who moved into these different geographical areas during historical periods? It is evident these questions cannot be answered, but they preoccupy and engross the minds of many researchers concerned with the history of the Bedouins.

At this stage, it would be useful to have a closer look at the Bedouins in general and then at the Bedouins in Oman, in particular. However, the paper focus will be on three groups; namely: The Bedouins of the interior, the coastal Bedouins, and the Dhofar Bedouins.

### **The Bedouins**

For a long time, ignorance and misperceived views have overwhelmed these desert-dwellers and their representation. In his book «The Muqaddimah», Ibn Khaldun, the famous Berber historiographer and historian described the Bedouins as savages who roam the waste and barren regions (Franz 1967). He (ibid.) went further to say that they dominated the plains because they were savage and were known to plunder what they found easy and involved no risk. Again, the Bedouins limited their life to the basics of survival and necessity and they were not capable of improving their conditions. Nonetheless, Ibn Khaldun (ibid.)

pointed out that they preceded sedentary people living in cities. Hence, the desert was the root and the origin of civilization and urban centers. In other words, in time, they were there before the emergence of urban centers and hence civilization.

It must be said that in his account, Ibn Khaldun as a historian was completely dependent on oral reports. Oral reports and oral history as a means of investigation has its significant limits. Furthermore, oral reports are not evidence simply because they are less than second hand information. Oral history or reports can by no means portray genuinely the history or view any society. No ethnic group or its history can be expressed by oral reports or oral history.

No doubt, the Bedouins were utterly misapprehended by Ibn Khaldun and others. Until recent times, a romantic image of “noble” Bedouin has also emerged ennobling culture, norms and way of life. A common impression circulates portraying the romantic image of the Bedouins in Arabia. They are misjudged and their true nature, culture, social organization and economy were only understood in the early seventies of the last century after serious anthropological studies.

The name Bedouin in the Arabic language stands for a person residing in the desert (the badia), away from urban centers. In other words, the term Bedouin is a common name given to a person or a group of people who dwell in the desert or in arid areas. Indeed, these groups of desert dwellers are regarded as an illustration and a characterization of an Arab culture, which is a portrayal of a distinctive way of life and an extensive oral poetic tradition, but most of all the upheld traditional convention of honour.

Indeed, Bedouins might share some features of their adaptation with other mobile groups, but they are culturally and ethically independent.

Bedouins extend over a vast geographical region in many countries across Asia and Africa. They are in Saudi Arabia, the United Arab Emirates, the Sultanate of Oman, Yemen, Palestine, Iraq, Syria, Jordan, Sudan, Morocco, Libya, Egypt and Tunisia. Their adaptation is geared to arid conditions, limited natural resources and unpredictable circumstances. Bedouins maintain an adaptation and a way of life that proved to have conformed to scanty natural resources and harsh environmental conditions.

### The Bedouins of Oman

In Oman, Bedouins live along the seacoast and in the interiors of the country. Some inhabit the open arid semi desert areas and others close to the mountains range in the North (Fig. 1). All these groups maintain a close association with the oasis and urban centers across the country.

Archaeological records provide no evidence of the Bedouins in Oman. In fact, the archaeological records contain no evidence of the Bedouins. Alternatively, nothing much beyond the short notes by the historians and travelers in Oman. However, a number of studies have addressed different aspects and characteristics of the Bedouins in the country. Such studies are by Birks (1976); Carter (1974 & 1977); Scholz (1977a, 1977b, 1982); Chatty (1990, 1991, 1994, 1996a, 1996b, 2000, 2002, 2004, 2006a, 2006b, 2006c); Webster (1991); Eades and Watson (2003); ElMahi (2011, 2013a, 2013b) and Hardan and Amzat (2012).

The Bedouins of Oman have been reported by Scholz (1977) to consist of the following groups:

- 1) The Bedouins of Inner Oman.
- 2) The Bedouins of the coastal plain of the Batinah.
- 3) The Bedouins of Dhofar.

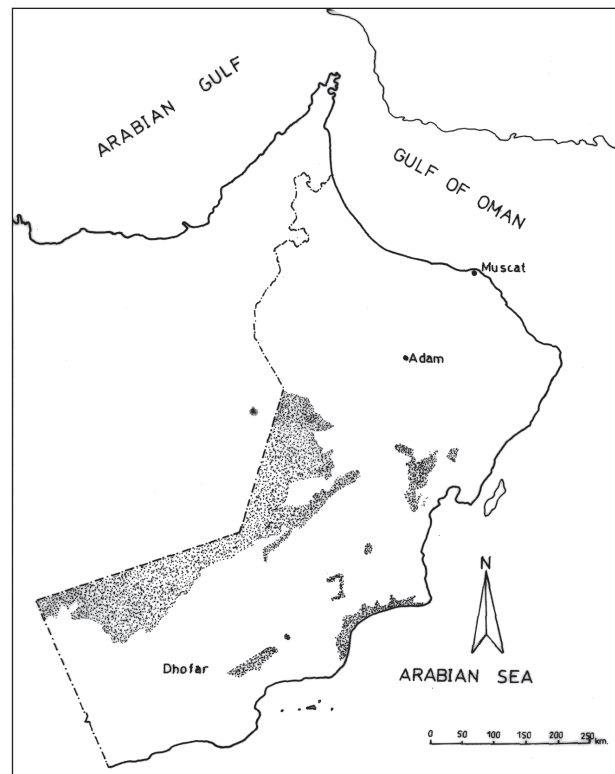


Fig. 1: Study areas in the Desert and Dhofar.

- 4) Mountain nomads (Shawawi).
- 5) The Bedouins of Central Wadi Region.

Furthermore, Scholz (1977: 65) pointed out the following Bedouin tribes in Oman starting from northern to southern Oman to include the Afari, Duru, Jenabah, Wahibah, Harassi, Bait Khathir, al Mahra, al Rasidand al Batahira. In addition, those Bedouins in al Sharqiyah and Batinah (Scholzibid.)

Again, ElMahi (2011; 2013a and 2013b) carried out a study on the coastal and interior Bedouins. Additionally, further field work was conducted among Al Batinah Bedouins and the Bedouins of Musandam in 2011-2012 (Fig.1). The study of the Bedouins was carried out by informal interviews and field observations. In Oman, the Bedouin groups can be traced to the following:

- i. Interior Bedouins including the Shawawi.

ii. Coastal Bedouins of al Sharqyah

iii. Al Batinah Bedouins

iv. Musandam Bedouins

v. Dhofar Bedouins

Traditionally and throughout contemporary history, the Bedouins in Oman are known to be nomads with few animals and some are also fishing. Scanty natural resources such as water and pasture dictated a style of movement and seasonality. In fact, their adaptation is geared by the inhospitable environmental conditions.

Today, the Bedouins are no longer the classic image of the past. They do not travel on camels, they use trucks instead; some live in the simple (daen) shelters made of date palm branches (Fig. 2) and many still do keep herds of camels and goats. At present, education, health service and water have reached them. Indeed, the Omani government has wisely avoided enforcing settlement and change to the Bedouin groups across the country. It was left for them to decide freely whether to settle down or maintain their traditional way of life. Definitely, no society can change between a day and a night. In the case of Oman's Bedouins, change came gradually and spontaneously; but most of all the transformation was carried out voluntarily by the Bedouins themselves.

Bedouins in Oman have features and basic cultural traits in common. Nonetheless, although they are bound by a common culture these groups show variation in their adaption, economy and the regions they inhabit.

Moreover, the Bedouins' economy is subsistence economy, which is based on production and distribution within each family. It is mainly to meet the family's needs and consumption. Besides, the Bedouins are not known to make or produce any tools or a set of articles for specific purposes. For example, they



**Fig. 2: "daen" shelters made of date palm branches**

do not produce or use pottery. Nonetheless, Bedouins produce ropes and other kit pieces made of organic material. The articles they make and use do not leave any traces to be an archaeological evidence later on.

Patriarchy among the Bedouins is the social organization. It is the supremacy of the father in the clan and family. It is the patriarchal lineage where the father is the center of rightful reliance of all members of the family. The male line is the core of the Bedouin family. They are polygamous and more than one wife in marriage is permitted. These groups are basically related by marriage and their lineage descends from a common progenitor.

### **The Bedouins of the Interior**

The Bedouins of the interior in Oman include the Shawawi. The Shawawi groups live very close to the mountains in North Oman. There are also the other Bedouins roaming the interior of the country. Basically, the Bedouins consist of small families scattered over a vast terrain of sparse natural resources. Each family has between one to two camels and few goats. Their economy can be described as a subsistence economy where the goat plays a major part in their economy. Camels again are essential animals in their life and economy.



Bedouins economy cannot be separated from their movements. The Bedouins do not concentrate in one location. They are continuously spread out in the vast terrain. Although they spread widely, they observe their own territoriality and honour the other groups' territory. The state of natural resources being scanty make them keep and revere these tribal marked terrains. Meager water and pasture force them to follow systems of movement. The first, is the cyclic movement which is basically followed by the Bedouins of the interior. It is a cyclic movement but according to certain location within their tribal territory. The second one is seasonal transhumant movement. In one of the informal interviews; one of the Bedouins in Dhofar was asked by the author: Why do you keep moving around the whole year? The old Bedouin replied:

“It is for pasture and not for water. We can carry and transport water, but no one can carry or transport pasture”.

This explains the motive behind the cyclic movement they carried out within the year. Herding their animals is the principal occupation among these groups; and animals signify their capital.

### **The Coastal Bedouins**

The coastal Bedouins share a good deal with the other groups in the interior. However, living along the coasts imposes certain specifics in their economy and type of movements. Indeed, the coast conditions have always influenced their being. Again, seasonality and resources have a crucial influence. The seasonal transhumant movements are geared by the seasonality of the region. The coastal Bedouins of al Sharqiyah in eastern Oman have a recognized seasonal transhumant movement known locally as “al Qaez”. It is the summer movement from the coast to the interior and namely to the oasis.

This movement is justified by the coastal Bedouins every year to avoid the summer heat and humidity. Again around this time of the year water reduces and the monsoon winds roughen the sea to the extent that it impedes safe fishing activities.

Their economy can be described as a subsistence economy which is dependent on fishing and goats' production. However, fish is not only a source of subsistence, but also a source of income and exchange of goods. During winter and spring, the coastal Bedouins are engaged in fishing. The largest proportion of their catch is dried in the sun. In their summer movement to the interior, they take the dried fish to exchange or sell to those in the oasis or the Bedouins of the interiors.

### **Al Batinah Bedouins**

The Bedouins of Al Batinah region keep goats and camels and practise cyclic movements. They have very close relationship with the settled communities of fishermen and farmers along the coast of Oman Gulf. Exchange and trade are carried out with all the urban centers along the coast of Al Batinah region. Among the most important items you get from the fishing communities is the dried fish and molluscs. Although they are desert dwellers, fish is a crucial item in their diet.

### **Musandam Bedouins**

The history of the Musandam region is the progeny of its geography. Musandam lies in the most northern part of the Sultanate of Oman. In the distant past, the dynamic movements of the earth's crust formed the area's mountainous landscape and coast. They also shaped the mountains and “fiords” which characterize the region.

It is not known when Musandam was first inhabited. But, it would not be surprising if



**Fig. 3: Low parts where Bedouins of Musandam live**

man has come upon the region soon after the invention of boats and the opening of the ancient maritime route from eastern Oman to Mesopotamia, Persia and India, around 2300 BC.

These Bedouins present a completely different adaptation. They live in small narrow strips of land at the lower parts of the mountains of Musandam (Fig.3). In other words the only available land for them which can give them access to the sea is the narrow rocky shores. These narrow strips of land are facing narrow and deep inlet of the sea between the mountains' cliffs and steep slopes. The narrow sea inlets in Musandam resemble very much the fjords found in Norway.

In this setting live few Bedouin families. Only a small number of houses are built in this

limited space. They are completely isolated and the only access to them is through the deep inlet of the sea. Therefore, these couple of houses are completely isolated from any other Bedouin groups. Musandam Bedouins are entirely dependent on marine resources. They fish in these narrow sea inlets and trade in fresh and dried fish. They also keep few goats. Their movement across the sea inlets is carried out by small boats. They are not completely isolated, but maintain relationship and links with the families in Musandam and other locations along the coast.

The history of the Bedouins of Musandam is not known. Elderly informants state that their ancestors migrated to these parts of Musandam a long time ago to avoid wars and conflicts. They came here seeking safety. In those days, according to the elderly informants, fish was



abundant and require little effort to catch. No doubt, the area met the requirements of the early Bedouins.

It seems reasonable to assume that the early Bedouins of Musandam must have moved out from Al Batinah coastal area. It is known that Al Batinah area witnessed various interactions and confrontations during historical times. The ancestors of these Bedouins escaped conflicts and found great shelter in Musandam's mountain and its narrow sea inlets. In fact, it is a well-protected area and attracts neither trespassers nor robbers. However, the land limited them, but the sea offered a means of securing the necessities of life.

### Dhofar Bedouins

The nomadic pastoralists in Dhofar region in southern Oman may be regarded as "Bedouins" (Scholz 1977 and Janzen 1986). Though they do not use the term to describe themselves, they prefer to use tribal names like, Jabbali, or Shahri or Mahri, etc. It is important to question whether these Dhofari pastoralists are Bedouins or not. When compared with the Bedouins, they do not speak the same language which is Arabic. Arab culture is the main characterization of the Bedouins in Arabia, which is not the case with the Dhofari nomadic pastoralists. Again, their culture and social organization are different.

Indeed, the culture of any human society is the language, social organization, political structure, religion, economics, technology and art. In fact, it signifies the principal means of survival in any given environment. The environmental conditions in Dhofar are completely different from those conditions of central Oman. Dhofar presents a characteristic ecoregion in southern Oman. It is marked by a seasonality of wet and lush greenery caused by the southern monsoon winds. On the other hand, the Bedouins in northern Oman inhabit

a rather arid area typical of semi-desert conditions. Nonetheless, the name of the game is survival. Again, it is important to note that Islam has brought many common features and aspects in life to the two groups, but still they remain ethnically and culturally different.

In fact, there are two groups in Dhofar regions which can be described as Bedouins: The nomadic camel pastoralists (Fig.4a) and the goat herders (Fig. 4b) (cf. Janzen 1986, El Mahi 2001; 2011 and 2013).

### Discussion

The fact that remains is that our knowledge about the early history of the Arabs in the Arabian Peninsula is scanty and insufficient to be fully grasped. The Arabs did not record any period of their own history. The Arabs were scattered tribes over Arabia, and oral history and the community memory was the single means of keeping and narrating their history. This may explain the unreliability of the sources and hence the impediment of the situation. Consequently, someone like Dahl (1890: 156) assessed the Arab's tradition as a basis of information and specified the following:

"If we turn to the tradition of the Arabs as a source of information about their early history, we find that it scarcely reaches back to the beginning of the Christian era".



Fig. 4a: The nomadic camel pastoralists in Dhofar



**Fig. 4b: Goat herders in Dhofar**

Indeed, the Bedouins were first known to Europeans in crusading times, which ranges between 1095 and 1291. Before that time, the Bedouins as nomadic Arab groups in Arabia were not known. These dwellers of the desert are traditionally split into related tribes. The individual or single family units comprise the tribe.

Chatty (2006: 140-141) discussed the origin of Oman's tribes in the following:

“The six largest pastoral tribes of Oman divide themselves into two groups: these descended from Qahtan and those whose origins go back to Nizar (also known under the name of ‘Adnan). The main Qahtani tribes are the Mahra, the

Jeneba, the Bayt Kaythir and the Harasis. These tribes gradually moved north into Oman from Yemen and Hadramaut beginning two or three millennia ago. The Nizari or ‘Adnani tribes include the Duru and the Wahiba. These tribes as well as other sedentary groups are said to have come to Oman from the north or through the Buraymi pass sometime in the 2nd or the 3rd century AD. There are other categories by which these largely pastoral peoples identify themselves. These include the differentiation between Hinawi and Ghafiri supporters – the opponents in the early 18th century civil war in Oman. In many cases, the Ghafiri supporters tend to believe in their Nizari or ‘Adnani origins and the Hunawi supporters tend to hold to



Qahtani myths of origin. Increasingly, members of these pastoral tribes have also self-identified themselves as Bedouins.”

Chatty (ibid.) concludes that the Bedouins are linked to the Arab tribes in Arabia. In fact, interviews with elderly informants among the Bedouins of Oman confirm that they trace their ancestry and ethnic descent back to the ancient Arab tribes in Arabia. This all is based on oral reports, which cannot be taken as evidence to indicate the ancestry of the Bedouins in Oman. And here we need to highlight that the name “Bedouin” is no doubt a recent name given to those nomads in Arabia and Africa.

As mentioned previously, the Bedouins of Oman provide no direct evidence in the archaeological records of Oman. Archaeological investigations have covered almost all parts of the country and concluded the existence of prehistoric groups attributed to the Stone Age, Bronze Age and Iron Age. Nevertheless, no archaeological report can identify Bedouins remains in the archaeological context simply because these groups are presented by a culture, which is not demonstrated by any material culture or tools associated with the Bedouins specific culture. In other words, there is no specific cultural material or any archaeological material that can identify Bedouins. Simply, the Bedouins throughout their known history did not produce or develop any specific tools or any sort of cultural material that can be related or linked to their individuality and common identity. They were completely dependent on the products of other groups and especially in urban centers.

In reality, there is no precise marked cultural material that can be an attribute or characteristic of the Bedouins. Furthermore, another side of the focus is the absence of archaeological evidence, which perhaps can be explained by

the following facts.

The Bedouins are not sedentary. They are continuously moving in search for pasture and avoiding unfavourable environmental conditions. Their hamlet sites are ephemeral. As it happens, these small locations are not lasting and are usually occupied for a very short time. Consequently, it is expected that debris of the daily activities such as food-waste and other material are extremely limited and insignificant. This is clearly the outcome of being nomadic and not settled in one location. The Bedouins in Oman are known for practicing two characteristic types of movements: transhumant seasonal movement and cyclic movement. These movements are underlying constituents in the Bedouins' adaptation. In essence, these movements are specific and crucial schedules geared in response to the seasons and natural resources.

The ephemerality of the Bedouin's sites has been attested by the excavations of test pits in camp sites of contemporary nomadic camel pastoralists' (Sahnout and Gadu) in Dhofar region. The excavations uncovered neither scattered rubbish nor any remains (ElMahi 2013: 14-16). The examined sites were occupied seasonally and for around twenty-two years. And when one of the elderly occupants of the site was told that the test excavations exposed no material. The following is his response (ElMahi 2013: 15):

“There was nothing to be left behind. And what was there in our possession was little and too valuable for us to be left behind. If whatever you have is little and useful. Then you must be careful not to drop or lose it”.

Although these sites were occupied seasonally and for a period of twenty-two years, the test excavations revealed no evidence of occupation and any sort of activities. This is explainable

by the fact that the Bedouins' hamlet sites are ephemeral since cyclic or transhumant seasonal movements necessitate regular shifts from one location to another.

Moreover, these test pits clearly indicate that an archaeological survey can easily miss detecting such sites. These ephemeral sites cannot be spotted since they lack the basic characteristics used by archeology in identifying a site. And for this reason, the adaptation of prehistoric nomadic pastoralists moves their lives beyond the grasp of archaeology.

Correspondingly, it has been attested now that Bedouins and nomads possess very little cultural material (ElMahi 2011 and 2013). The weight of the belongings of a Dhofari nomadic camel pastoralist's family does not exceed seven kilograms (ElMahi *ibid*). This is again compelled by the fact that mobility is an elemental constituent of adaptation. Conspicuously, mobility is their security. For the Bedouins and all nomads in the world mobility is the safety valve of their security. Therefore, there is more than one element shaping their adaptation including the scanty natural resources, climatic conditions and security.

At this stage, it is essential to have a look at the development of climatic conditions and its impact on human adaptation. On the one hand, this facilitates comprehending the Bedouins ways and methods. On the other hand, it can possibly cast light on the probability that the prehistoric groups who inhabited these regions were related in one way or another to the contemporary Bedouins?

There is substantial evidence that indicates climatic change by the end of the Holocene. Van Campo (1983) and Sirocko et al. (1993) investigated the subject and its consequences in the region. They emphasised that the

climatic conditions had turned dry around 4500 years ago in the area of the Arab Sea. In turn, it indicates that by 3000 BC the arid and dry conditions took place.

Furthermore, Leizine et al. (2002: 221-232) carried out pollen analysis and soil tests in the coastal area of as-Suwayh (North- East) in Oman. The study attested that the mangrove trees (*Rhizophora* sp.) have flourished in the southern coastal areas of Oman around 6000 years ago in a climate much influenced by the tropical and summer rains. And a simple comparison with the present day environmental conditions where it rains in winter times and the spread of *Prosopis cineraria* trees bear evidence of climatic change. It is worth mentioning that *Prosopis cineraria* trees are known among the Bedouins of Oman as (khaf). They are found in areas with rainfall as low as 150 mm. *P. cineraria* trees are resistant to drought and commonly found in the margins of sands. They are known to resist drought and thus, indicative of the arid conditions and the presence of a deep water table (cf. Brown 1992).

Likewise, this indicates climatic change from tropical to dry climatic conditions ca 5000 years ago (Leizine et al. *ibid*). This investigation concluded that the emergence of the oasis in the region took place ca 3000 BC as a result of the climatic change (Leizine et al. *ibid*).

It is unequivocal that climatic conditions dictate adaptation characteristics on human groups. It has been observed that traditional societies with no modern technology or advanced energy are greatly adapted to their environmental conditions. Climatic conditions influence their economy, culture and ways of life. Indeed, the Bedouin adaption is geared up to arid conditions, meager natural resources and unpredictable circumstances. In essence, it is an adaptation, which is intended to calculate the





**Fig. 5: Tethering stones of prehistoric traps, central Oman**

incalculable. Equally, adaptation is characterized as the long-term cultural process of maintaining a balance between population and natural resources within a given environment (Bodely: 1994: 295). The Bedouins of Oman demonstrate continuous survival of their cultural system in a given environment over a long time. Indeed, this can be recognized as adaptive success.

The Bedouins adaptive success can go back to 3000 B.C, when climate shifted and drier conditions prevailed as soil tests and pollen analysis indicated. No doubt, the Bedouins adaptive success to arid conditions was facilitated by certain environmental factors such as the oasis.

It is unequivocal that the climatic change led to the beginning of the oasis in the region about 3000 BC (Leizine et al. *ibid.*). The development

of the oasis emerged as a result of the climatic change. However, man and other creatures took advantage of this new ecological setting.

Again, there is evidence that indicates more favorable environmental conditions in the area of central Oman around 7000 BC (El Mahi 2007:37-62). Geological investigations which were carried out in the study area indicate that the area had once witnessed humid and hot conditions that suggest a tropical paleoenvironment (El Mahi 2007: 53). Further evidence of wet condition is provided by the tethering stones found in three regions in Oman: Dhofar (cf. Cremaschi and Negrino 2002:333-334), the Ja'alan area (cf. Cleuziou and Tosi 2007:49-50) and Al Mudhaibi area (cf. ElMahi 2007:37-62 and ElMahi 2014:78; (Fig.5). These tethering stones were made and



used by prehistoric groups to trap large sized animals (cf. ElMahi 2007 and 2014).

This evidence of wet and hot paleoclimatic conditions confirms the results of the preceding paleoclimatic studies conducted in Oman. For example, this wet period was detected in speleothems of the Oman Mountains from 10,000 years to 5500 years BP (Fleitmann et al., 2005; Burns et al., 1998, 2001). Inter dune deposits of the Wahiba Sand are dated to the Holocene wet period (ca. 9300 to 5500 years ago) by using infrared stimulated luminescence (IRSL) (cf. Radies et al. (2005). Furthermore, Fleitmann et al. (2005) and Burns et al. (1998, 2001) report that the beginning of the Early Holocene was a wet period and precipitation increased over southern Arabia.

Therefore, around 3000 BC climatic change must have had a significant effect on the prehistoric groups inhabiting the various regions in Oman. In facing a climatic change, human groups have two options, either to migrate or to adapt. The choice between the two options is a delicate balance. Throughout history of man, many groups migrated and others adjusted to the prevailing conditions.

By and large, climatic change does not take place all of a sudden, but it is usually a very gradual process. Therefore, Neolithic groups in these regions will not migrate immediately, but only after conditions become evidently inhospitable and do not satisfy their requirements. Migration is not an easy decision to take whether by hunters/gatherers or Neolithic farmers or herdsmen. The attitude of their contemporary traditional counterparts is unequivocally similar. The contemporary groups such as the Bedouins are bound by their territoriality. They are all related to a territory or an area. It is a persistent attachment to a specific territory, which they consider

home. Accordingly, it would be reasonable to assume that deserting or leaving a territory by the Bedouins or their ancestors can only take place under harsh and compelling conditions. Territoriality is categorically manifested Bedouins' symbiosis.

Therefore, it possible to postulate that climatic change around 3000 BC did not directly force prehistoric groups in Oman to migrate and compel them to desert their territories.

The other option or choice in facing changing climatic conditions is to acclimatize and seek ways to adjust and adapt to the gradually changing climatic conditions. As for Neolithic pastoralists, there were many choices in adapting to such conditions. First, there was the type of animal, which constituted the capital and the livelihood of the group. As previously mentioned, Oman witnessed around 3000 BC typically arid and dry climatic conditions similar to those of the present day (Leizine et al. *ibid.*). Therefore, the animals that can survive these condition and produce are the camels and goats. Their tolerance for scanty resource and harsh ecological conditions qualified these animals to survive and become tools of survival for those who dwell in such conditions.

What's more is the notion that claims "security in numbers". It is equally applied to humans and animals. Bedouins in Oman keep the number of their animals according to their understanding and evaluation of the natural resources in their environment. In Dhofar for instance, a family of nomadic pastoralists keeps a maximum of twelve camels. This was justified by the interviewees that small number of animals means enough pasture for the animals and good milk yield (ElMahi, 2001 and 2013).

Furthermore, mobility serves as a significant tool in surviving the harsh conditions and consequences of meager natural resources. At

this point, it is important to look at the reason and impetus behind the mobility carried out by the Bedouins. Indeed, the Bedouins feel that their mobility was always a security measure. However, the Bedouins in Oman carry out mobility according to two types of movements: cyclic movement and seasonal transhumant movement.

In Oman, the Bedouins of the interior, coastal areas and Al Batinah are known to carry on cyclic movements. The reason for adopting this type of movement is water. Their main concern is finding water. In the course of seeking water pasture comes. Their counterparts in southern Oman have a different target. In Dhofar, the Bedouins of Al Najd move from one place to another seeking pasture. Upon enquiry, an elderly informant stated that the Bedouins' purpose can be explained by the fact that water can be carried anywhere, but pasture cannot be carried at all (ElMahi 2013:27).

It is reasonably clear that the prehistoric populations were limited in numbers. At present, the Bedouins populations have low ethnoarchaeological. In a sense, their variations in demographic (reproductive and mortality) rates are low. Studies of nomadic camels and goat herders in Dhofar and central Oman (ElMahi, 2011 and 2013) have indicated smaller populations of Bedouins. Low ethnoarchaeological is attributed to the practices of the Bedouins themselves, which focus on reproduction and especially the practice of preventing unwanted pregnancies. Again this is conducted by long breast feeding and practicing infanticide (El Mahi, 2013: 20-21). The Bedouins are aware of the serious consequences of high numbers. They acknowledge and express awareness of the factualness of their environmental conditions and security necessities.

Therefore, it would not be surprising if prehistoric groups had adopted similar measures in facing gradually building up harsh conditions and scarce natural resources. In fact, it is anticipated that prehistoric groups had taken similar measures to bridge the threats, complications and impediments of the changing climatic conditions (El Mahi, 2000). Any Stone Age prehistoric group who had experienced similar environmental limitations had adopted comparable practices.

At that stage, it is necessary to examine the archaeological records for evidence that can possibly support further the analogy between the Bedouins and the prehistoric groups in Oman. Analogy facilitates inquiries with conclusions based on resemblances and similarities between different ways and methods applied by two traditional societies

An ethnoarchaeological study documented the traditional method of trapping spiny tailed lizards *Uromastix aegyptia* used by the Bedouins in central Oman (ElMahi 2002: 31-46). This reptile is usually found in arid and scrubland areas characterized by sand and gravel. In Oman, the Bedouins are active in trapping this lizard for food. The study of the Bedouins in Oman and their adaptation indicates that the spiny tailed lizard is part of their occasional diet (cf. ElMahi *ibid.*). In addition, Bedouins' traps were compared with rock scenes in northern Saudi Arabia. The prehistoric scenes, which portray the lizard show great resemblance with the Bedouins' traps (Fig. 6 & Fig. 7) (cf. Anati (1972 and 1974).

**Accordingly, the following assumptions can be proposed:**

1. The prehistoric groups who made these rock scenes in northern Saudi Arabia were indeed trapping the spiny tailed lizard for food.



**Fig. 6: Snares Bedouins used to catch the spiny tailed lizard**

2. The trapping method used by the Bedouins and the prehistoric groups are comparable. This in return indicates that the technical level of both the Bedouins and prehistoric groups are analogous.
3. The depiction of the spiny tailed lizard in the rock scenes indicates that the environmental conditions during the time of this rock art were dry and arid, similar to those in central Oman.

Given the fact that the Bedouins are goat herders and also foragers (cf. ElMahi, 2011) it is reasonable to assume that the adaptation of the Bedouins bears considerable similarities to those during prehistoric time especially the hunter/gatherers (foragers) of Mesolithic and the animal herders in the Neolithic of the Stone Age. Again, ethno-archaeological study of the goat herders in Dhofar shows that the gathering of esculent plants is a well-established daily practice. Consequently, this contemporary practice enhances the analogy (ElMahi, 2011:

118-143).

Up to the present, archaeological excavations have not revealed any evidence of the presence of the spiny tailed lizard in Oman. Once more, this can be clarified by the following facts:

1. The spiny tailed lizard osteological structure and density do not stand the processes of burial, decay, and preservation (taphonomy) that affect their remains. It has a limited chance to be recovered by archaeological excavations.
2. Those who trap the spiny tailed lizard and include it in their diet are settled groups, but practicing nomadism since they live in the same arid environment of this lizard.

At this stage, it is worth mentioning that the Bedouins' areas in central Oman do not contain mountains or rock shelters which can facilitate the activity of rock drawing. This geological setting might explain the absence of rock scenes in the area. On the other hand, Dhofar mountainous areas contain a vast range of rock drawings that exhibit no scenes of the spiny lizard. This is explainable by the fact that Dhofar ecological conditions are different from central Oman. Yet again, the area of al Najd is arid and scrubland, but does not encompass any mountainous and rock shelter stretches. Therefore, the absence of rock drawing in the area of Dhofar is comprehensible.

One can conclude that the practices of the Bedouins and their adaptation to certain environmental conditions can possibly offer a reasonable analogy to the prehistoric groups and their environmental conditions and adaptation.

Another archaeological evidence comes from central Oman. During the mid-Holocene ca 7000 BC, hunters/gatherers in central Oman; namely in al Medaibi area were hunting large sized animals by using tethering stones (El



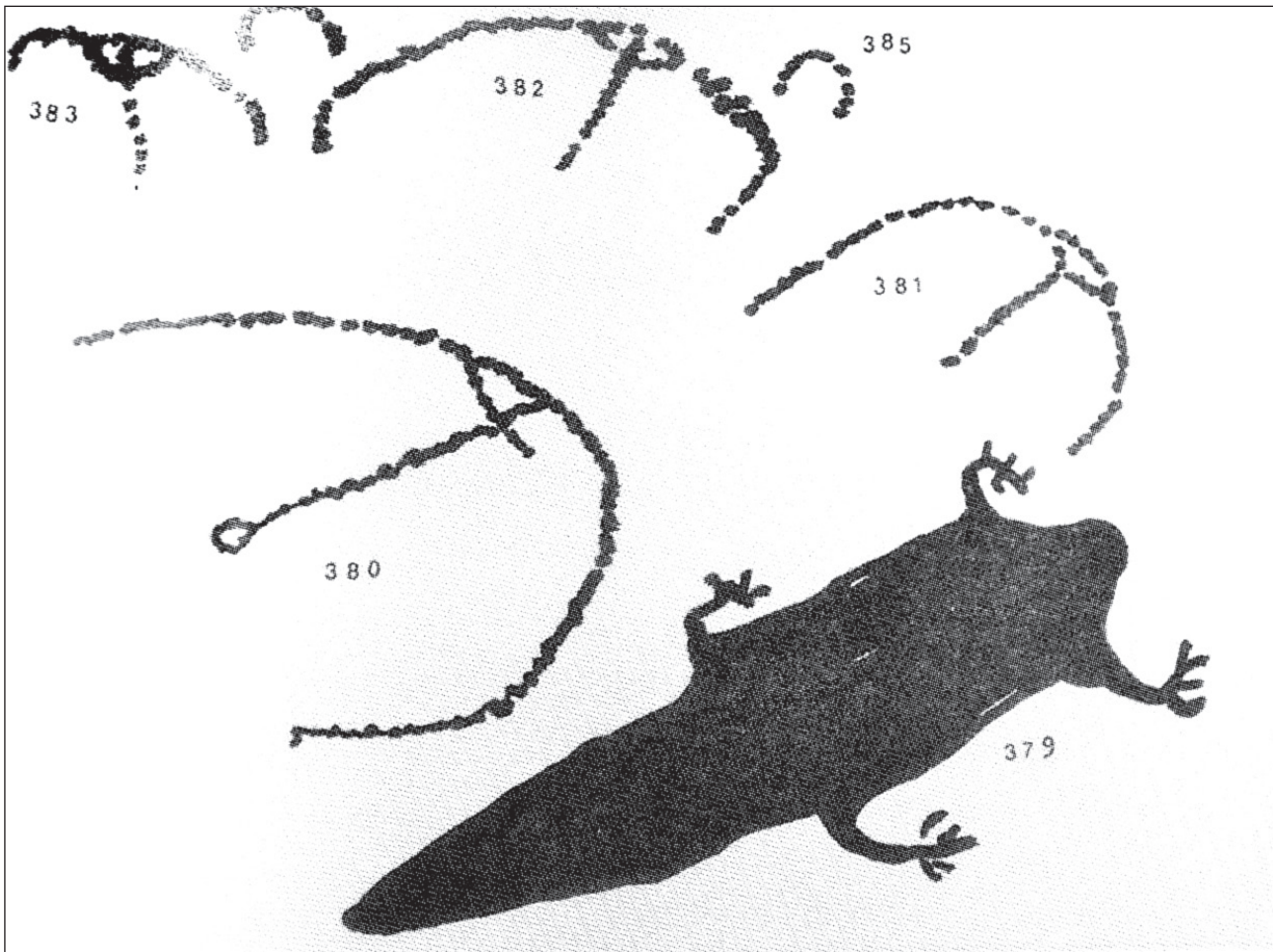


Fig. 7: Rock drawing of the lizard and snare set (After: Anati (1972 and 1974).

Mahi 2007:37-62 and 2014: 7-18). The weight of these tethering stones is in range of 20 to 50 kilograms per stone. This indicates that such stones are used to trap large sized animals. Therefore, the stones must have been set to trap large sized herbivores, otherwise the presence of the tethering stones in numbers and distribution over the area does not make sense. Again, the presence of large herbivores in al Medaibi area is an indication of grassy plains with few trees similar to the habitat of these herbivores of the Ethiopian fauna in Africa.

By 3000 BC the climate changed and eventually led to environmental alteration in the region of al Medaibi. Aridity became a more dominant feature over the landscape. This

must have happened very gradually. In such changing conditions natural resources diminish gradually. The response of animals and plants to climate change is not the same. In such changing conditions animals can migrate but plants diminish. The option for man is either to migrate or adapt to the new conditions.

It must be pointed out that such climatic conditions do not happen suddenly and degradation of natural resources does not take place instantly. It is quite possible that hunters/gatherers in the region of al Medaibi have acted differently in the sense that some must have moved and others remained in their changing habitat.

The change in conditions must have been gradual and therefore those who stayed must have adopted gradually and slowly. One needs to remember that the economy of hunters/gatherers was a subsistence economy. Their livelihood was based on day-to-day food procurement activities. Therefore, the gradual adjustment and adaptation to the new conditions were spontaneous and hand in hand.

Is it the case that people adapted to such arid conditions and then acquired animals equally adapted to such environment? Or is it groups of people who migrated to these areas with their animals? In the absence of evidence that can cast light on these questions, there can be no precise and reliable answers until further archaeological evidence is provided.

### **Territoriality**

Regardless of their continuous mobility and transitory settlements; Oman's Bedouins uphold a clear system of territoriality. It is a persistent attachment to a specific land and the pattern of behavior associated with the defense of this land or territory. Their mobility and movements are well calculated within these territories. The Bedouins respect the principle of territoriality.

Territoriality has been the concern of several researchers such as Betts (1989); Wilkinson (1983); Dyson-Hudson and Dyson-Hudson (1980); Spooner (1971); Bacon (1954); Coon (1943); etc. For example, Sack (1986: 1-2) suggests that territoriality denotes a spatial strategy. It is meant to control an area in order to have a hold over both people and resources. In other words, it is a strategy of influence and control. Moreover, it is how people manage themselves in space and how they exploit natural resources, and most of all how they exhibit the significance of that space. It is an attachment to a certain territory that encompasses frequent behaviour in the protection of a territory.

At the same time as territoriality is a system of spatial behavior, Sack (ibid.) puts forward the following question:

“The issue then is to find out under what conditions and why territoriality is or is not employed”.

The function of territoriality among the camel and goat nomadic pastoralists in Dhofar has been studied by ElMahi (2013 and 2011). The following field observations seem noteworthy (El Mahi, 2011:90).

“...territoriality as it has been observed in the field is an organizing and precautionary measure adopted by the goat herders. In reality, territoriality legitimizes the ownership of pasturage and water resources in the territorial realm of each herding group or family. .... ”

ElMahi (2011:90) concluded that territoriality is the effect of an ancient cultural ecology that progressed in specific environmental settings. It is necessitated by the pastoralists or Bedouins requirements and to secure resources. In essence, territoriality is a code that organizes the exploitation of the meager resources in Oman. Indeed, it is very much related and reflected by the pattern of behavior associated with the defense and exploitation of a territory.

Was territoriality known and practiced by prehistoric groups? It is known that territoriality and the behaviour associated with the geographical location do not leave any material evidence that archaeological investigations can detect. Nonetheless, the scrutiny of settlement pattern can perhaps shed light on the issue of territoriality among prehistoric groups. But the present indication, meager as it is, suggests the necessity for territoriality among prehistoric groups or nomads in arid areas.

No doubt, territoriality is an essential necessity for prehistoric pastoral groups or

nomads inhabiting arid areas. Therefore, it would be reasonable to assume that prehistoric groups lived within territories of their own. Definitely, it was to serve a purpose and enable them to survive the challenges of their environmental conditions. It is unquestionable that in arid conditions neither the prehistoric groups nor the Bedouins choose their habitat. They are compelled to adapt to the aridity and meager natural resources in their areas.

### Conclusion

In conclusion, it is evident that climatic change in the life of human societies does not happen suddenly or in a night and a day. It is a gradual and a slow process. Therefore, in response to climatic changes, humans change gradually by either adapting or migrating. It is well manifested that climatic change drives the human resident population in the ecosystem to either adapt or migrate. At the same time, animals are known to migrate to another habitat, while plants die out. Consequently, the adaptation of the Bedouins in Oman illustrates how human beings can adapt to such harsh conditions. Adaptation is a way of life and enduring cultural course that keeps up a balance

between the group and the natural resources in their habitat. Climatic change must have compelled the prehistoric groups to adapt or migrate seeking better conditions elsewhere. Therefore, the Bedouins' adaptation offers an acceptable analogy to the prehistoric groups in central Oman before 3000 BC.

In arid environmental conditions, mobility becomes a necessity for human groups. It becomes part of their adaptation to the strict environmental conditions. The Bedouins like other nomadic groups in the world do not migrate for the sake of migration, but for a vital purpose. Moreover, mobility is always governed by push-and-pull factors. The Bedouins in Oman carry out mobility in response to the climatic and environmental conditions. These same factors must have compelled prehistoric groups to traditional mobility. Again, the Bedouins of Oman offer a reasonable analogy.

On the other hand, territoriality is well observed among the Bedouins of Oman. It serves a significant purpose in such harsh environment. It is logical that territoriality must always have been practiced during prehistoric times by the hunters/gatherers and later on pastoralists.

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**ملخص:** يتأقلم البدو في عُمان على ظروف بيئية تشح فيها الموارد الطبيعية. هذا ولم تكشف التحريات الأثرية عن دليل للبدو في سياق الحضريات الأثرية، إذ إن ثقافة البدو لم ترتبط بأي مواد ثقافية أو أدوات قاموا بصنعها. هذا البحث، ينظر في تأقلم مجموعات البدو في عمان، بغية أن يؤسس لمقاربة معقولة مع مجموعات سكانية عاشت في الأقاليم نفسها في فترات ما قبل التاريخ. فالتأقلم على ذات الظروف البيئية والمناخية يعمل على تحديد مسار بقاء الكائن الحي ووسائله؛ وعليه، فإن التأقلم على بيئة متشابهة ينتج عنه تأقلم متشابه. ينظر البحث في مواقع سكنى البدو وثقافتهم المادية والتغيرات المناخية التي أحلت بالمنطقة بغية التوصل لفهم مجموعات ما قبل التاريخ في المنطقة. ويثمن البحث تأثير التغيرات المناخية على المجتمع الإنساني، وما يترتب عليه من تأثير في تأقلم وثقافة المجتمع. إن تأقلم البدو يقدم نموذجا لتأقلم المجموعات التي سكنت عمان في فترات ما قبل ٣٠٠٠ قبل الميلاد؛ فالتغير المناخي لا بد وأنه قد أرغم المجموعات السكانية على الرحيل لبيئات أفضل أو البقاء والتأقلم. وكما هو معروف، فإن التغير المناخي لا يحدث فجأة بل في تدرج، الأمر الذي يسهل على الإنسان التأقلم مع هذه التغيرات، كما إن تبني أي مجموعة لنظام الإقليمية يكون استجابة لواقع وإقليم بيئي تشح فيه المصادر. وهي ثقافة بيئية قديمة ابتكرها الإنسان لتأمين بقائه.

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