

Climate change in the cradle of civilization history essay



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The Fertile Crescent is a region in Western Asia, where ancient civilizations have developed. Population increases and intermittent dry spells in the region have resulted in agricultural innovations. The reason why this region is being called as Fertile Crescent is the fertile land and optimal climate conditions. Geographically speaking this area has been determined by Albert T. Clay as follow; “ The fertile crescent refers to an ancient area of fertile soil and important rivers stretching in an arc from the Nile to the Tigris and Euphrates. It covers Israel, Lebanon, Jordan, Syria, and Iraq. The Mediterranean lies on the outside edge of the arc. To the south of the arc is the Arabian Desert. On the east, the Fertile Crescent extends to the Persian Gulf. Geologically, this corresponds with where Iranian, African, and Arabian tectonic plates meet.”[2]

Furthermore, ancient history has showed us a positive correlation between fertile soil or appropriate climatic conditions and development of civilization. Therefore, Fertile Crescent which is also known as the “ cradle of civilization” is the place where is believed to be home not only for the birthplace of various human civilizations but also other significant developments like writing and wheel. Appropriate climatic conditions are vitally important factor on development of civilizations. And the reason behind the occurrence of first “ civilizations” in Fertile Crescent is the agricultural production that fed by the rain. Moreover, As a result of agricultural production and long term settlement, some of the first cities of human being on world have occurred in the Fertile Crescent. Many different civilizations like Natufians, Sumerians, Babylonians, Amorites, the Hittites, and Assyrians have accrued in the in this small region of the world.

Researches on proxy records and excavations show the period of climate changes are often correspond to social change period as well. In other word, climate changes have crucial impacts on development of societies and its particularity. In this research paper, I'm going to look over the major Climate Change in the Fertile Crescent from 10, 000 B. C. to 2, 000 B. C. Particularly, to con on how the climate influence agriculture and what kind of impact it had on civilizations that occurred in that region.

11, 000 to 10, 000 B. C.

Younger Dryas

“ 15. 000 year ago, the impact of Ice Age chill extended into the heart of south-western Asia. From Greece to Egypt, the eastern Mediterranean lay under the influence of north-easterly anticyclonic winds that blew from the high-pressure masses over the Scandinavian and Siberian ice sheets”.

[3]Even though there were regular rainfalls the weather was dry. Tauros Mountains in Turkey, Jordan rift valley and Sinai Peninsula were seasonal landscapes where most of the Ice Age Bands lived in. Main source of nutrition were seeds and fruits, which depended on seasonal rainfalls.

“ When the great warming began, the northeasterlies subsided. Moister air flows from Atlantic and Mediterranean brought higher rainfalls. Warmer conditions after 13, 000 B. C. saw a rapid increase in acorn-rich oak forests, documented in pollen samples from ancient lake beds in eastern Iran, the Jordan Valley, and other locations”[4]. With the impact of great warming, small bands that lived over a vast area of Fertile Crescent become highly mobile. This means larger territories for hunters. When it comes about 11,

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000 B. C. a series of drought have occurred, which has endured for many generations: Younger Dryas.

“ Younger Dryas is a major cooling and drying climatic event with global impact for human settlement, subsistence and influenced cultural developments at the origins of agriculture”[5]. Several scientists have developed different theories about resolution of climatic and environmental reconstructions across the transition to agriculture and development of societies. One of the most accepted theory has been developed by Gordon Childe which is named as “ Propinquity Theory”. Childe argues that a desiccation trend forced humans into close contact with plants and animals surrounding permanent water sources. However many theorists came later have disproved Childe’s theory. Natalie D. Munro express those pro-arguments against Childe’s theory as follow “...climatic instability introduced by the Younger Dryas reduced the distribution of cereal crops, lowered carrying capacity, and thus uprooted the sedentary way of life that began 14. 5-13/12. 8 thousand calibrated years ago...”[6]

In order to lighten the relations between climate change and development of civilization during the period of Younger Dryas, different studies have been focus on settlement of Abu Hureyra(11, 500 B. C), which is located at Euphrates valley in modern Syria. Natufians were the first known settlers of Abu Hureyra. It has been stated that “ There’s nothing particularly distinctive about Natufian toolkit: the people relied on the same simple hunting weapons as their neighbours and predecessors. But a glance at their artefacts highlights the importance of plants foods in their lives such as pastels employed for pounding nuts or numerous mortars”[7]. Food like <https://assignbuster.com/climate-change-in-the-cradle-of-civilization-history-essay/>

acorns and pistachios were vitally important storable surpluses for Natufians, which kept them in same location. For about 500 years, the Abu Hureyra people(Natufians) had meat supply from hunting gazelles as well. In the course of time, constant food surpluses created bigger “ communities”. However, a rapidly growing population brought conflicts over foods particularly in dry years.

After about 11, 000 B. C. the classic strategies of social flexibility and mobility no longer sufficed, not only Abu Hureyrans, but also thousands of people living elsewhere in southern Asia. According to Brain Fagan “ no longer could people simply move away to better-watered locations, or fall back on less favoured ones.”[8]By passage of time, population located in many parts of Fertile Crescent have increased and they start to become less mobile. New permanent locations were defenceless to any rapid climatic shifts, particularly to long drought events. There are different theories on why and how the Younger Dryas has happened. One of the most accepted theory argues that the Younger Dryas was caused by a significant reduction or shutdown of the North Atlantic thermohaline circulation. However, geological evidence is standing far away from this theory. In fact, what has been more important for people of Abu Hureyra and other small communities around Fertile Crescent was dramatic temperature fluctuation. People struggled to maintain their lives because they have stopped to gather fruits from trees, nuts from the forest which were in a not reachable distance anymore. Only 400 years later wild cereal vanished and even pistachios became less common. In the length of time, landscape became more arid and the people became familiar to drier weather. However, the fight between

nature and mankind remained and they took the next virtual step of civilization. “ In about 10, 000 B. C., people start to domesticate seeds (rye, einkorn, and lentils)”[9]However, because of bigger population the problem of vegetation still remained. As a result, it’s necessary to underline that the extreme cooling of climate, Younger Dryas, could have great impacts on civilizations as it has impeded the progress of early civilization.

10, 000 B. C. to 8, 000

Domestication

So far my research question has focus only on what happened during Younger Dryas event and pre-conditions for possible first farmers of mankind in history. But there are still remaining questions to be answer in order to reveal the relation between climate change and its consequences on civilizations.

Today’s advance technology and knowledge provides various way of “ travelling” to past so as to understand the history of civilization. Recently, many different techniques/methods like tree rings, ice cores, mineral deposits, etc. have been developed by scientist for that purpose. Different ice core researches have provided us some of the most significant and exciting paleoclimate discoveries of the past. A research which has been done by an international team head by Richard Alley provided great information about climate records of hundred thousand years before present.

Figure 1 provides information about snowfall and temperature (°F) based on ice core data between 18, 000 BC to today.

Figure 1

Greenland last ice core climate record greenlandTempRecent. png

Source: Alley, The Two-Mile Time Machine, 2001.

The temperature records from Younger dryas period show a clear picture of big freeze in world climate. As it can be seen from the figure when it comes to about 11, 000 B. C, temperature record on ice core shows a radical change in temperature. Around 9, 500 B. C., warming resumed and that was the end of Younger dryas. As the temperatures rose the world became warmer. And inevitably “ Favourable climatic conditions brought steady improvements in the Fertile Crescent environment, which encouraged the growth and spread of wild plants and animals that constituted food supply for an increasing human population.”[10]

Going back to the late Natufian settlements, a possible picture of Abu Hureyra after Younger dryas would be like that: some men would still hunt the gazelles every spring but in a harder condition because of the over demand. However, climatic condition would be much more adequate for people because of warmer temperatures and increased rainfall. Pistachio and acorn trees would start to bloomed again and the forests which have been disappeared during Younger dryas would soon flourish again. In addition, Jared Diamond argues that in this period “ the hunter-gatherers of Abu Hureyra evidently knew the local wild plants and they used that knowledge to select and bring home only the most useful available seed plants.”[11]However they were not aware of the fact of being the first civilization who domesticated the plant.

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The first undisputed archaeological evidence for plant domestication comes from the Levant, a region on the eastern coast of the Mediterranean which includes present-day Syria, Lebanon, Israel, Jordan, and Palestine. At numerous sites throughout this area, evidence of the cultivation of emmer wheat, einkorn wheat, peas, flax, chick peas, bitter vetch, and barely has been discovered.[12] Assorted excavations from this area have the earliest determined date for plant (8,500 B. C) and animal (8,000 B. C.) domestication. However, Fertile Crescent was not the only location where domestication took place about that time. Surprisingly, dates for China are quite close to the Fertile Crescent's as well. Wheat, pea, olive, dog, sheep and goat were the first plants and animals which have been domesticated in Fertile Crescent. On the other hand, rice, millet, pig and silkworms were the subjects of domestication in China. Mesoamerica (3,500 B. C.) has been another independent origin of domestication in history. Evidently, domestication revealed independently in different geographical location in the world; within a few thousand years. During my research I have realised that many scientists who developed theories on agricultural origins (like Gordon Childe, Ronald Wright, Charlie Byrne, Robert Braidwood etc.) have focus on the worldwide synchrony of domestication and they have turn to climatic and environmental changes as an explanation of first agriculture. Particularly, it's well accepted that there were radical and rapid climate changes took place with the final recession of the ice sheets. However, these theories have not been enough strong to convince the argument of similar climatic and environmental instabilities have happened many times in the past without sparking agriculture. For that reason, personally I believe that

instead of a universal theory of origins of agriculture regional explanation approaches are more logical.

Except few scientists many archaeologists have agreed on the Fertile Crescent as the location for earliest agriculture. What make the Fertile Crescent being the birthplace early agriculture are undoubtedly the conditions. Frank Hole, an archaeologist in Yale University, described the precondition of Fertile Crescent for the plants domestication as follow: “ 1) foods of high quality are abundant and can be stored, 2) there is severe seasonal availability of these foods, 3) the territory is such that the people cannot override the limiting effects of seasonality on food resources through transhumance, 4) the territory or the resources themselves can be modified by humans to increase their yields, and 5) non-food commodities such as dung, wool, antlers, bitumen, obsidian, and so on, can be stockpiled”[13]He believes that the most the most important pre-conditions are possibly number 2 and 3. Personally, I believe that the fact of being able know how to store the high quality seeds is the most important pre-condition for domestication. Archaeological evidence on development of storages methods before domestication period in Jordan Valley show us the importance of this pre-condition to us clearly. Overall, when the essential plant species occurred in the region, people of Fertile Crescent have join the progress plant domestication necessarily. They have learned to gather and process the plant foods in sufficient amount, safety method(s) to store them, and distribute them. Another factor that had impact on domestication has been the rise in the sea levels. “ Increasing evapo-transpiration at the end of

Pleistocene led to the drying of lakes and a rise in sea levels also would have affected the abundance and pacing of resources"[14].

This conditions push the late Natufians took the first brave step towards cereals planting. This development has been very important for human being because it enhanced a food supply system. On the other hand studies from Abbo et al. concludes as follow; " We argue against climate change being at the origin of Near Eastern agriculture and believe that a slow but real climatic change is unlikely to induce revolutionary cultural changes".

[15]However, factors related to climate change are not the only ones that had impact on the domestication. Cultural settings, changing of landscape and changes in plants and fauna are other factors which have shaped the domestication as well.

8, 000 B. C. to 5, 800 B. C.

Spread of Agriculture and the 8. 2ky Collapse

After domestication took place in the Fertile Crescent spread of seeds became inevitable. " Soon after food production arose there [in the Fertile Crescent], somewhat before 8000 B. C., a centrifugal wave of it [spread], appeared in other parts of western Eurasia and North Africa farther and farther removed from the Fertile Crescent, to the west and east." [16]According to Diamond, the rapid spread had reached different locations as in the figure.

Figure 2:**The spread of Fertile Crescent crops across western Eurasia**

Source: Diamond; 1997; 181.

Diamond emphasizes that because of the geographical characters of Eurasia spread of agriculture from the Fertile Crescent into Europe, Asia, and North Africa was much faster than in other parts of the world. Any civilization where domestication of plants and animals arrived they ensured steady food supply as well. Naturally, population rose and villages became bigger and bigger to cities.

When people of different locations became farmer, in a short period some the small villages took their first step toward being the cradle of many civilizations. " By 8, 300 B. C., farming villages flourished on the Anatolia plateau in central Turkey, some of them close to sources of lustrous obsidian, fine-grained volcanic glass much prized for tool making and ornaments." [17] Approximately in 7500 B. C., one of the extraordinary settlements that flourished in Anatolia was Çatalhöyük which covers 13 hectares. Çatalhöyük was an enormous settlement because many early farming villages covered around only one hectare. Studies show people of Çatalhöyük were advanced in cereal agriculture and method to store them. This led them to grow rapidly and develop their civilization further. Another village was settled in the Jordan Valley names as Jericho, which was about 4 hectares. As Çatalhöyük, Jaricho was also advanced in agriculture. In addition, because of their locations both villages grew from the benefits of long-distance trade.

Probably, socio-economic conditions of early agricultural settlements in Levant, northern Mesopotamia, Anatolia, Balkans and eastern Mediterranean increased steadily until about 6, 200 B. C. However, when Earth's surface warmed again second post-glacial climate event, which is known as Laurentide ice sheet collapse, took place. When a big ice sheet collapsed, enormous amount of meltwater flowed out to the Gulf of Mexico and North Atlantic. This climate change led similar climate condition in Europe which happened during the Younger Dryas. Figure 3 shows Greenland ice climatic records extending to the last glacial maximum. In 6, 200 B. C., the Laurentide collapse can be observed clearly. After the collapse, instead of warm and rainy weather of Mediterranean climate, Fertile Crescent occupied by colder and drier weather of northerner pattern. That was start of a disaster for many farming societies in Mesopotamia, Anatolia and even in Balkans.

“ During the period of deglaciation that preceded the abrupt climate event of 6, 400-6, 000 B. C., a remnant Laurentide ice mass occupied Hudson Bay and served as an ice dam for glacial lakes Agassiz and Ojibway. The rapid collapse of ice in Hudson Bay allowed lakes Agassiz and Ojibway, which had previously discharged over spillways south-eastwards to the St Lawrence estuary, to drain swiftly northwards through the Hudson Strait to the Labrador Sea”[18]

Figure 3

Greenland ice climatic records extending to the last glacial maximum.

Source: Fagan; 2004; 24

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Research conducted by Shuman et al. about the event shows the result from lake level measurements and pollen data. Both data address the same result: a rapid climate change in North American happen because of the Laurentide Ice Sheet.[19]This rapid change in climate is known as 6, 200 B. C. or 8. 2 kilo year(ky) event. In the same research authors questions the reason of the 8. 2 ky event as well. “ Rapid transitions may result from abrupt changes in regional or global climatic controls that do not rapidly reverse whereas climatic oscillations appear to be the product of temporary forcing, such as meltwater pulses or glacial surges.”[20]

Another simulation research that has been carried out by various scientists on “ Rapid early Holocene deglaciation of the Laurentide” concluded that during the 8. 2 ky event melting water from Laurentide Ice Sheet rose the lakes Agassiz level about 1. 3 and 0. 7 cm of per year.[21]What is more important, a rapid rise in ocean level resulted floods at various places in the world. The results show a disastrous rise in global sea level which led to the flooding of the Euxine Lake and resulted a dramatic social change particularly in Southern Europe, Anatolia, and eastern Mediterranean

Climate history proves that within about 4000 years the balances of climate changed again. The conditions push back the development of early civilizations again as it did during the Younger Dryas. Melting water from the Laurentide Ice Sheet resulted in Atlantic circulation again. However, there are controversial opinions about impacts of the 8. 2ky event among historians and scientists. Some of them like Staubwasser and Weninger argue that there is a strong correlation between 8. 2ky and cultural, social and economical changes in the Neolithic phase.[22],[23]They claims that the <https://assignbuster.com/climate-change-in-the-cradle-of-civilization-history-essay/>

event had virtual impact on many of the farming villages including Çatalhöyük, Jaricho, and Abu Hureyra for 400 years.

Weninger et al. have put forward that “ the rapid spread of early farming to South-East Europe can be most plausibly understood as a direct and immediate reaction to abrupt climate forcing. The spread of early farming to South East Europe was extremely rapid and entirely synchronous with the catastrophic collapse of the ice dome above Hudson Bay at 8200 cal yr BP, many thousands of miles away”[24]On the other hand, personally I think not many scientists have doubt about effect of this 8. 2ky event on environmental settings. However, there are some suspicions about how this event affected developments of civilization. For instance, Weninger et al. proposed that “ the earliest pottery which has been discovered in Greece is associated with the incoming farming communities.”[25]However, Budja, an archaeologist from University of Ljubljana, refuted this argument by claiming that potteries come out before the 8, 200 B. P. within the hunter-gather framework at Danube Gorge, a region in Balkans.[26]Budja putting forth his argument by touching the first agriculture and animal domestication in Balkans but his argument has not been feeble because of lacking in evident. However, there are high number of scientist who believes that when 8, 2 ky event happed farming villages were already settled near main European rivers.

Furthermore, most probably, new climate condition pushed the farmers to the rivers and shore of lakes. Perhaps, people of Çatalhöyük moved to western and southern coasts of Euxine Lake to remain their life at a place where the soil was still fertile and the weather conditions were favourable for
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farming. Unfortunately, there is no reliable source of information about these settlements yet. When it comes to the life in the Fertile Crescent, not much has been changed during the past centuries there. People were using the simple tools for agriculture and hunting. They did not have the knowledge and technical skills of using complex working tools. The distinction between role of the men and woman in society were still similar as after the Younger Dryas period. Fagan express the situation of societies in Fertile Crescent as follow: "...since people were still dispersed on patches of easily cultivated soil, they had space to pursue game, catch fish with traps and nets, and forage for grasses, fruit, tubers, and nuts in grassland and forest. Sedentary and farmers might be but their simple agricultural economy and regular depends on the game and wild plant foods gave them flexibility unheard of in later agricultural societies." [27] Overall, the 8, 2 ky event has not been virtually determinative factor on development of the civilization in Fertile Crescent. However, when it came to 5, 800 B. C., Atlantic circulation changed again, the moister conditions of Mediterranean weather turn back to the Levant. Before people of Fertile Crescents taking a further step trough path of civilization, another climate catastrophe happened in 5, 600 B. C.

5600 B. C to 5400 B. C.

“ Noah’s Flood” ?

By 6, 000 B. C., the last ice was coming to an end. The earth’s temperatures were raising consequently, North ice sheets were melting. That caused the rise of the World Ocean and pushing the Mediterranean Sea towards the Black Sea. “ One of the greatest natural disasters to affect humanity came in about 5, 600 B. C. when the rising waters of the Mediterranean flooded the <https://assignbuster.com/climate-change-in-the-cradle-of-civilization-history-essay/>

deep basin of the Euxine Lake, 150 meters below the Marmara, to form the Black Sea"[28]. For a long time it has been recognized that because of the rise in Ocean level during glacial period, the Black Sea became isolated by Mediterranean and Marmara seas. Another hypothesis which has been widely accepted argues that Euxine Lake became the Black Sea by outflow from Mediterranean and Marmara Seas troughs Dardanelles channel and the Bosphorus. However, in 1993 an American, Russian, Bulgarian and Turkish research team began to wonder if there could be a geological explanation for Noha's flood story and they concluded.

This research team developed another hypothesis of an abrupt flooding of the Black Sea named as " An Abrupt Drowning Of The Black Sea Shelf At 7. 5 Kyr Bp"[29]which argues that the Euxine Lake has been fed with the water coming from large massive ice in the far north. As a result the level of Euxine Lake rose dramatically within thousands of years. It's not difficult to think about the impact of this massive transformation on mankind lived in the region of Anatolia and Southeast Europe. Before coming to the possible impacts it is necessary to go into the details of this transformation. Figure 4 shows the water flows that passed from Euxine Lake/Black Sea trough Bosphorus to Aegean and vice versa.

Figure 4: Reconstructed Lake and sea levels between 17, 000 to 7, 500 B. P.

Source: Ryan et al, 1997, 122. Note: Aegean (A), Sea of Marmara (M), and Black Seas (BS), and their connections/isolators via the Dardanelles (D) and Bosphorus (B)

The Laurentide collapse resulted in rise of Atlantic Ocean level until last glacial period. As it can be seen from the figure, in 7, 500 B. P. the level of Mediterranean Sea was 15m lower than shorelines while this number was 30m in 9, 000 B. P and 90m in 14, 000 B. P. Moreover, “ as the Black Sea [Euxine Lake] was in very close vicinity to the Scandinavian-Russian ice cap, the melting water from the glaciers were supplied into the Black Sea through the major drainage system constituted by large European rivers (Danube, Dniepr, Dniestr and Bug)”[30]By 5, 600 B. C, Black Sea flood took place. Fagan described as follow “ the Sea of Marmara was lapping at the edge of a shrinking berm. ...within days, the stream became a torrent, then a roiling waterfall flowing at over 90 km an hour. Soon the fertile deltas and river valleys vanished under water. The largest freshwater lake in the world rose at an average rate of 15 centimetres a day”[31]. As it can be seen from the figure in a year later the lake Euxine filled by the sea water came from Aegean and Marmara seas. In other word, Euxine Lake turned to be Black Sea in a short time period. This climate event has been related to the “ Noah’s Flood” by some scientists and editors of popular newspapers quite often. However, so far any hypothesis has not been enough to convince the scientific world.

Going back to the main concern of this research paper, one of the greatest natural disasters that affect civilization was the “ Noah’s Flood” in about 5,600 B. C. And of course this climate event also had strong impacts not only on farming villages of Fertile Crescent, but also the settlements in Balkans and eastern Mediterranean. There are not enough sources to develop predicted results of the flood yet. But there is no doubted that such climate event may have been one of the most distractive event the earth have ever see. If Black Sea or “ Noha’s Flood” really did occur, it would be a monumental event in the development of civilization. I would have scared a large number of people to others part of the world and it would certainly change how later civilization would have evolved. It’s uncertain how many people might have been affected by the flood. Probably, few hundred thousand of people have been affected by the flood. This number may not be so drastic if not taking account the world population of this period. According to historian Luc-Normand Tellier from Québec University, “ before the appearance of agriculture total world population never exceed fifteen million inhabitants.”[32]Overall, this event probably diminished a huge proportion of world population. It’s believed that the spread of agriculture from Fertile Crescent to Europe, with migration of early farmers, in a short period is another consequence of the Black Sea flood. Probably, most of the early civilizations settlements, where the flood had reached have experience the harmful results of the flood like hunger, diseases, deaths, migrations. To sum up, this climate event had great impact on civilizations of the Fertile Crescent and other regions alongside.

5,800 B. C to 2,000 B. C.

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Climate Change and Sumerians

“ The water [Black Sea flood] stabilized after about two years. Hundreds of villages lay deep below the now-saltwater sea. Settlements far inland now lay at the head of sheltered days or exposed to the fury of cold winter storms blowing onshore. But life went on as it always had, in a landscape dissected by countless rivers that led inland into an unknown terrain of endless for