

Environmental Effects in the Agriculture of Medieval Egypt

Wan Kamal Mujani

Institute of West Asian Studies (IKRAB), Universiti Kebangsaan Malaysia,
43600 Bangi, Selangor, Malaysia

Abstract: Agriculture has been the main source of the economy for all dynasties established in Egypt and the Mamluk kingdom was no exception. It is clear that agricultural yields during the period were extremely variable being very dependent on environment and surrounding. Thus, the aim of this short article is to analyse the natural disasters in Egypt during the Mamluk period (1468-1517) and how these situations affected agriculture at that time. Based on chroniclers' reports, there were climatic and biological disasters which affected agriculture. This can be seen in a reduction of agricultural yields and a fluctuation of crop prices. These natural hazards, however did not lead to a total collapse of agriculture in Egypt. Rather, it caused disruption of agricultural activities, destruction of crops and economic loss.

Key words: Environmental effects, natural hazards, medieval Egypt, mamluk, agriculture

INTRODUCTION

Any assessment of the agricultural situation in the Circassian Mamluk period must discuss environmental issues and natural disasters since these regularly affected the agricultural sector leading to the destruction of crops and economic loss (Bell, 1975). The Mamluk historians have preserved valuable data on the natural disasters during their times. For example, Ahmad b. Ali al-Dalaji al-Misri (d.1435), al-Maqrizi (d.1442), Ibn Hajar al-Asqalani (d.1449), Ibn Taghri Birdi (d.1469), al-Sayrafi (d.1495), Abd al-Basit (d.1514) and Ibn Iyas (d.1524) mention the environmental problems which the peasants had to deal with and describe how these problems played a significant role in their lives. Two categories of disasters are significant in the present discussion, namely climatic and biological.

CLIMATIC DISASTERS

Since, Pharaonic times, Egypt has been witness to many severe weather disturbances. The Mamluk period was no exception. References to the occurrences of drought, floods, violent rain or storms, hail and severe cold are readily found in the research of contemporary historians. The following are some descriptions of these climatic disasters in Egypt and the implications they had for agriculture and the lives of the rural dwellers.

Droughts: It is worth nothing that the climate of Egypt was already dry and that agriculture did not depend on

the rainfall but rather on the yearly Nile flood. The consequences of drought are the loss of standing crops and shortage of the water needed by people and livestock. The impact on human life depends on the extent to which a particular society relies upon the vagaries of climate to raise crops and make a living (Alexander, 1993). In the case of Egypt, drought occurred when the level of the Nile was very low and not sufficient for cultivation. Indeed, the historians of the time remark that insufficient flooding of the Nile meant difficulty for the peasants.

Cultivation could normally only be undertaken when the height of the Nile reached 16 cubits. If the water of the Nile did not rise sufficiently to cover the soil, the peasants could not cultivate the land. A level of 14 or 15 cubits was too low and would leave many of the agricultural areas and basins dry (Borsch, 2000). The result was that some of the arable lands were not sufficiently covered by water and thus could not be cultivated and the price of commodities increased.

During the period under consideration, insufficient rises of the Nile were reported in 1493, 1496 and 1510. According to Ibn Iyas, the drought in these years affected various kinds of fruit, vegetables, flowers and grain. Sometimes the Nile receded quickly after it had reached the level of 16 cubits. This is reported to have happened in 1468, 1484, 1485, 1496 and 1505. According to Egyptian historians, the prices of crops increased due of shortages in these years. Modern research carried out by some geographical and archaeological scholars supports these statements. For example, Hassan (1981, 1997) in his analysis of stages in Nile floods from 640-1921, reveals the episodes of low Nile discharge during the years 1470-1500.

Floods: In contrast to the droughts mentioned by contemporary Mamluk chroniclers, they also often refer to floods caused by the overflow of the Nile and unexpected heavy rainfall. Even though the Nile made life in Egypt possible with its water and alluvial deposits, the river might also be the cause of misfortune in the economic and agricultural life of the country (Tucker, 1981). If the flood exceeded 17 cubits, some areas became submerged under lakes for a long period and the proper time for sowing passed without taking place. Similarly, if the flood remained high for a long time it would not only cause damage to crops and cultivated lands but also to property.

During the period under review, there were damaging floods and rainstorms. In 1471, floods occurred and on 22 November, 1469, violent rain caused the canals to overflow and damaged the houses. Heavy rain is also reported to have occurred in July-August 1474 and October-November 1481. In 1477, floods covered some areas including the province of al-Minya and affected crops, dams, roads and houses. In 1497, another flood took place and caused damage and in 1510, heavy rains inundated the markets. On 28 March 1516, Ibn Iyas reports the occurrence of flash floods in Cairo because of heavy rain in Upper Egypt. These events necessarily caused considerable hardship for the peasants.

Windstorms: Windstorms, sometimes accompanied by sand, wrought destruction several times during the Mamluk period and contemporary historians report that most of these affected agricultural activities. Thus, in October-November 1481, a strong wind hit Cairo. The storm blew from Damietta and was accompanied by dust, thunder, lightning and heavy rain. In the province of Damietta itself, some trees and houses were destroyed and some ships belonging to the Franks were sunk. In 1482, 1483 and again in 1485, windstorms damaged some valuable trees and crops such as bananas and apricots. In December 1503 to January 1504, a black windstorm struck Cairo leading to the destruction of some houses and palm trees. The same situation happened in the Delta, especially in the provinces of Damietta and Fariskur where the heavy rain which accompanied the storm caused the canals to overflow to flood some cultivated areas.

These events caused much economic loss in terms of homes and livelihood. Countryside dwellers were hurt by the destruction of their crops and valuable trees while urban residents suffered the loss of their properties as well as having to pay higher prices for commodities or goods. Casualties and damage to property were difficult to avoid since, there was no accurate forecasting that could warn people and thus no action could be taken before the disaster (Tucker, 1999).

Hailstorms and severe cold: Another cause of physical injury, the disruption of agricultural activities and the destruction of produce was hailstorms. Not surprisingly, damage appears to be correlated with the intensity and duration of the storms and the size of the hailstones which these produced. The damage itself was not only caused by the hailstones but sometimes also by the high winds and torrential rains which accompanied them (Alexander, 1993).

During the period under consideration, a hailstorm occurred in Damietta province in October-November 1492 and damaged the crops and killed livestock such as cattle and donkeys. According to Ibn Iyas, each hailstone was the size of an ostrich egg. In December 1510, the provinces of Sharqiyya and Minufiyya were hit by further hailstorms. The crops were destroyed, livestock perished and some of the peasants were injured.

Severe cold was another source of difficulty for Egyptian peasants. Frost would destroy the crops and even lead to the death of some animals. For example, in 1481 severe cold is reported to have killed some livestock in Gharbiyya. The same occurred in 1482 in Qarya Damrawa, this time ruining the crops. In December 1489-January 1490, freezing temperatures and frost killed some animals in Cairo. In 1492, crops were destroyed and some livestock perished in Damietta because of extreme cold. On another occasion in January-February 1494, cold weather and snow struck Alexandria. A similar disaster happened again in 1510 in the Sharqiyya, Gharbiyya and Minufiyya provinces. This time crops were destroyed and some animals perished. Clearly, these events caused hardship to the peasants and affected agricultural production (Tucker, 1981).

BIOLOGICAL DISASTERS

The contemporary chroniclers also inform us that the agricultural sector was similarly affected by biological disasters such as plagues, rat infestations, locusts, epizootics and crop blight.

Plagues: The plagues which occurred in the Mamluk kingdom were not a new phenomenon but had already been known in the early Islamic period (Dols, 1974). Many Mamluk historians mention the adverse effects these had on the economic life of Egypt's population. This is also documented by some modern scholars (Dols, 1977).

The outbreak of the Black Death in 1348 during the reign of Sultan Hasan b. al-Nasir Muhammad is well known in the history of the Mamluk kingdom. The plague began in Egypt during the autumn of 1347 and by April 1348 it had spread all over the country, reaching its peak during the months of October, 1348 to January, 1349. It

came to an end in February, 1349. The estimate given by Ibn Habib, a contemporary historian that the black death reduced the population of Egypt by a third is perhaps not far from the truth.

According to Russell (1966) during the middle ages, Egypt had three to four million inhabitants. The first black death pandemic was followed by recurring outbreaks of plague in Egypt right up until the fall of the Mamluk kingdom. For example, there is evidence that pneumonic plague recurred regularly in this period. There were various types of the disease during the Mamluk period such as bubonic, septicaemic and pneumonic plague. Pneumonic plague is distinguished by the sufferers spitting blood as a result of massive infection of the lungs. This form of plague tends to occur primarily in the winter (Dols, 1979). According to some scholars, pneumonic plague is almost 100% fatal and death occurs within 24-64 h.

The occurrences of plagues in Egypt from the period of 1468-1517 are shown in the Table 1 (Yaakub *et al.*, 2011). The effects of plagues on the agricultural sector have been documented by some modern scholars, particularly as concerns the increased mortality rate among Egyptians as happened for example as a result of the black death. Thus, Abraham Udovitch says that demographic changes caused by plague affected Egyptian agriculture and that smaller harvests were produced (Borsch, 2004). While Shoshan (1982) likewise states that current assessments of economic trends in Egypt between 1350 and 1500 emphasise the causal relationship between depopulation and decreased economic productivity.

Al-Sayrafi mentions that at its peak about 4,000 people died in Cairo during the first outbreak of the

plague in 1468. He estimates the number of deaths by counting the biers that were prayed over in one important oratory in Cairo and roughly multiplying that number by the number of principle oratories in the city. According to Ibn Iyas, the plague caused death among children, Mamluks, black slaves, slave-girls and foreigners. During the second outbreak of the plague in 1476-1477 about 2,000 of the royal Mamluks died (Neustadt, 1946). This was because they were young and not sufficiently immune. Later, during the third outbreak of the plague in 1492, about 200,000 people died. This pestilence ravaged both the urban and rural populace (Petry, 1994). On another occasion in 1498, about 200,000 people died because of the plague, 1,200 of them being royal Mamluks. Another disaster occurred in 1504 and killed >100 people. In 1504, about 4,000 people died when the plague was at it most intense. In 1513, the Bureau of Escheats recorded that 356 people died at the height of the plague. Ibn Iyas says that this figure represented as little as 10% of the total number of deaths in Cairo during that year.

The effect of the plague can also be seen in the countryside (Tsugitaka, 1997). A number of peasants died in the disaster and those who survived migrated to areas not affected by the plague. In the plague of 1476-1477 some villages were abandoned. According to al-Sakhawi in 1492 the plague killed a number of peasants in Siryaqus and reduced a number of farmers to working in the farmyard at the Bilbays. On another occasion in 1513, the plague hit Asyut and caused high mortality among the peasants.

It is difficult to estimate Egyptian mortality rates in the rural areas during the period under review. No records of deaths among the peasants were kept. Moreover, most contemporary estimates of death are for major cities and are of little assistance in estimating rural depopulation. However, this disaster affected those members of the population who worked in the agricultural sector, especially in cultivation or harvesting.

Rats: Rats were another threat to the agricultural sector and an infestation could cause considerable damage to crops and harvests. Indeed, Ahmad b. Ali al-Dalaji al-Misri explicitly mentions the trouble attacks of rats and mice caused for the peasants. Other accounts from primary sources show that infestations of rats destroyed plants, vineyards, fruits and other crops. Rats were not only responsible for damaging the crops in the fields but also the harvest in the granaries. During the Mamluk period there are similar reports of rats ruining the crops.

Table 1: History of plagues in the early Islamic period

Dates	Plagues
1469	This first outbreak occurred during the reign of Sultan al-Ashraf Qaytbay. The plague persisted in Egypt for several months from January until May
1476-1477	The second outbreak also occurred during the reign of Sultan al-Ashraf Qaytbay. It continued for several months from December until April
1492	The third outbreak also happened under Sultan al-Ashraf Qaytbay. In this year, the plague started in January and worsed in March. In June the plague lessened in intensity
1498	The plague reached Qatya province in January and then spread into Cairo in February. It started to abate at the end of May
1504	In this year, the plague reached its peak at the end of June
1505	This was a continuation of the previous year's plague. It intensified during February and March
1507	The plague spread in Upper Egypt at the end of this year
1513	The plague began early in this year and reached its peak in April and May

For example in 1416 during the reign of Sultan Mu'ayyad Shaykh, rats destroyed plants in some areas in Lower Egypt. While in May 1511, they spoiled the harvest while it was on the hreshing floors and in granaries. They also destroyed the wheat and barley in the fields (Petry, 1994).

Locusts: Locust infestations also resulted in the destruction of crops and plants, sometimes destroying the food intended for livestock. During the period under review, there are two recorded instances where locusts ruined crops and grain, these being in July 1469 and August 1472. Although, the exact losses are not specified, it must clearly have had an adverse effect on agricultural production (Petry, 1994).

Epizootic: Livestock and draft animals were understandably extremely important for Egyptian peasants. Indeed, they totally relied on these animals. The peasants ploughed using oxen or cattle, carried crops by donkey and sometimes made their clothes from the wool of sheep and goats. They also bred some of these animals specifically for milk or meat production.

During the Mamluk period, contemporary sources mention the threat of an epizootic to these animals which affected the life of the peasants and agricultural activities. The consequences of animal disease can be seen in that one nobleman who owned 1,021 cattle before the outbreak of the disease, lost 1,003 of them. Similar occurrences took place in 1491-1492 and 1509. As a result, the price of cattle increased as did the cost of hiring animals for ploughing. The scarcity of cattle also led to a scarcity of meat (Petry, 1994).

Crop blight: In addition to biological disasters during the Mamluk period crops were also subject to blight and other diseases, one occasion of this occurring on 23 May 1468.

Worms and caterpillars: Attacks of worms also contributed to the devastation of crops and some villages lost half of their yield because of them. On several occasions crops such as clover, wheat and berseem were affected. During the period under consideration, similar occurrences took place in 1485 and 1486. The usual result was that the peasants faced hardship because of losses and an increase in clover prices, this plant being the basic fodder for cattle in Egypt (Petry, 1994).

CONCLUSION

The bases of the Egyptian economy that is agriculture was in a somewhat weakened state during the

period under consideration. The period was witness to some changes in agriculture such as a diminution in the agricultural produce and a gradual increase of crop prices. Among factors that had an adverse effect on agriculture during the Mamluk era were climatic and biological disasters.

These phenomena did not however, result in an absolute deterioration of Mamluk agriculture. It caused disruption of agricultural activities, destruction of crops and economic loss.

ACKNOWLEDGEMENT

This research was conducted by using the research funding of the UKM-OUP-CMNB-09-38/2011 Project.

REFERENCES

- Alexander, D., 1993. *Natural Disaster*. Chapman and Hall, New York, ISBN: 9780412047411, Pages: 632.
- Bell, B., 1975. Climate and the history of Egypt: The middle kingdom. *Am. J. Archaeol.*, 79: 223-269.
- Borsch, S.J., 2000. Nile floods and the irrigation system in fifteenth-century Egypt. *Mamluk Stud. Rev.*, 4: 131-145.
- Borsch, S.J., 2004. Thirty years after lopez, miskimin and udovitch. *Mamluk Stud. Rev.*, 8: 191-201.
- Dols, M.W., 1974. Plague in early Islamic history. *J. Am. Oriental Soc.*, 94: 371-383.
- Dols, M.W., 1977. *The Black Death in the Middle East*. 1st Edn., Princeton University Press, New Jersey, ISBN: 978-0691031071, Pages: 390.
- Dols, M.W., 1979. The second plague pandemic and its recurrences in the Middle East: 1347-1894. *J. Econ. Soc. Hist. Orient.*, 22: 162-189.
- Hassan, F.A., 1981. Historical Nile floods and their implications for climatic change. *Science*, 212: 1142-1145.
- Hassan, F.A., 1997. The dynamics of a riverine civilization: A geoarchaeological perspective on the Nile Valley, Egypt. *World Archaeol.*, 29: 51-74.
- Neustadt, D., 1946. The plague and its effects upon the Mamluk army. *J. Roy. Asiatic Soc.*, 78: 67-73.
- Petry, C.F., 1994. *Protectors or Praetorians? The Last Mamluk Sultans and Egypt's Waning as a Great Power*. SUNY Press, Albany, ISBN: 9780791421406, Pages: 280.
- Russell, J.C., 1966. The population of medieval Egypt. *J. Am. Res. Centre Egypt*, 5: 69-82.

- Shoshan, B., 1982. From silver to copper: Monetary changes in fifteenth-century Egypt. *Stud. Islamica*, 56: 97-116.
- Tsugitaka, S., 1997. *State and Rural Society in Medieval Islam-Sultans, Muqta and Fallahun*. E.J. Brill, Leiden, Pages: 337.
- Tucker, W.F., 1981. Natural disasters and the peasantry in Mamluk Egypt. *J. Econ. Soc. Hist. Orient*, 24: 215-224.
- Tucker, W.F., 1999. Environmental hazards, natural disasters, economic loss and mortality in Mamluk Syria. *Mamluk Stud. Rev.*, 3: 109-128.
- Yaakub, N.I., W.K. Mujani, W.M.H.W. Hussain, Z.A. Zainol, K. Jusoff, E.A. Jamsari and H.M. Lateh, 2011. A note on the *Mamluk historians* description of plagues in Egypt. *Middle-East J. Sci. Res.*, 7: 108-111.