The Nile and Irrigation System during the Mamluk Period (1468-1517)

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. This can be seen from the fact that the Mamluk sultans gave special attention to this sector by establishing various bureaus specifically to supervise agricultural activity. Indeed, most of the inhabitants of Egypt were involved in agricultural activity of one sort or another. Therefore, the following is a discussion of the Nile and irrigation system in Egypt so as to explore its importance in relation to agricultural activities. This article finds that the Nile was and remains the main source of agricultural prosperity since this country has a dry climate and consists wholly of desert. There are several factors that affected irrigation system during the period under review such as the negligence in digging canals and in repairing irrigation dams.

Key words: Nile, irrigation system, agriculture, Mamluk.

INTRODUCTION

The history of agriculture under the Mamluks cannot be understood in isolation. On the one hand, it closely corresponds to modern circumstances, while on the other, the practices of Mamluk agriculture were clearly a continuation of those in existence during Pharaonic times. Indeed, it is not uncommon for contemporary scholars to remark on the basically unchanging nature of agricultural activity in Egypt. For example, Alan K. Bowman and Eugene Rogan (1999) remark:

It is easy even in the 1990s to stand on the banks of the Nile, to observe the rectangular plots of land, the primitive methods of irrigation, the continued reliance on animal power and basic tools and to aver that agrarian life in Egypt has changed little since Pharaonic times.

Similarly, environmental conditions such as the climate, the role of the Nile, the irrigation system and natural hazards have changed little in the long history of Egypt (Bell, 1975). With the above observations in mind, it seems justifiable to draw from information concerning ancient and modern agricultural conditions within Egypt in this discussion on agriculture during the Mamluk period. It is indeed only by such means that the gaps in our knowledge can be filled and anything approaching a comprehensive picture can emerge.

The Nile:

Indeed, the Nile saves Egypt from the desert and provides the means for agriculture and settlement along the river. The Nile in Egypt receives its water from two major sources: the White Nile which drains a large area of equatorial Africa, and the Ethiopian tributaries. The Ethiopian tributaries, namely the Atbara and the Blue Nile, are the most important for agriculture in Egypt since they contain a lot of sediment. The White Nile contains less sediment because it has a long journey starting from its source, namely, Lake Victoria in Kenya and Tanzania, and most of the sediment is lost during its passage through lakes and swamps or is deposited in the river’s own level reaches long before it joins the Blue Nile at Khartoum (Hassan, 1981; Rolfe, 1917).

From the Pharaonic era until relatively recent times, flooding was by far the most crucial and continuous phenomenon in the agricultural life of Egypt and the yearly flood (called in Arabic Ziyada, Fayd or Fayadan) was an eagerly awaited event. The flood is caused by heavy rainfall in the highlands of Ethiopia where the Blue Nile and Atbara have their sources. The warm, rain-laden winds from the Indian Ocean sweep against the Ethiopian highland and, cooled by the contact, give up most of their moisture. This usually happens in summer. (Al-Maqrizi, 1998; Gemmill, 1928).

The annual rise in the Nile water level started in Aswan at the end of May or early June and reached its peak sometime in the first half of September. The volume of water at Aswan ranges from 45 million cubic metres at low water to over 700 million cubic metres in the high water of mid-September. Around Cairo, the water level began to rise in the first week of July and reached its maximum between the 20th and 30th of September. The water stayed more or less stationary for two weeks and then started to recede. It reached half level by mid November and was at its lowest point in mid May. The river continues to rise for about ninety days (from 1st July to 28th September) and continues falling for about 230 days (12th October to the end of May) (Horner, 1855). In December, when the muddy flow from the Ethiopian highlands had practically ceased, the Nile in Egypt was dependent in the main upon the continuous flow from the region of Lake Victoria through the White Nile. However, this water contains very little sediment.
During the reign of the Mamluks, a level of 16 Dhira’ or cubits (1 Dhira’ -lit. ‘arm’- is equivalent to 0.58 of a metre in Egypt) or 9.28 metres was regarded as the Wafa’ al-Nil (the fulfilment of the Nile flood) and was sometimes called Ma’ al-Sultan (the Sultan’s water). This was seen as suitable for cultivation and for irrigation. Amin Sami (1916) mentions that the Nile most often reaches this level in the Coptic month of Misra (August). The statistical data collected by him show the chronological distribution of the plenitude of 16 Dhira’ to be as follows: July - 16.9%, August - 75.4%, September - 6.7% and October - 1%. According to Horner (1855), in the middle of August the water generally enters the great side branch on the left bank, the Bahr Yusuf, and it is at this time that the artificial branches or canals are opened. This represents the commencement of the inundation over the plains. If the Nile reached this level on time, after the water had receded the peasants would start to plough and sow the fields. At the same time, grain prices remained stable and may even have become cheaper because of the certainty that there would be a bountiful harvest. If the Nile level exceeded 16 Dhira’, or was less than 16 Dhira’, or there was a delay in the flood, this would have a serious effect not only on the cultivation of crops but also on the peasants, the general populace and the government (Qasim, 1978).

A low water level meant that all potentially cultivatable areas would not be irrigated and consequently the size of the ensuing crop would not meet annual requirements. A sharp increase in grain prices would occur as a consequence and this would continue until the next satisfactory crop was harvested. The situation was at its worst when the flood did not exceed twelve Dhira’ because this meant famine (Kramers, 1995). The same result would occur when the Nile flood was too high. Some areas would become submerged under lakes and the time for sowing would pass without this taking place. Al-Maqrizi (1998) explains that if the level of the Nile is seventeen Dhira’ and above, Ghala’ (high prices) would follow and would destroy the people. Similarly, if the flooding were to be delayed, a sharp increase in the price of grain would also ensue. However, prices would gradually fall after the Nile reached its full level.

The level of the Nile has since Pharaonic times been measured by the Nilometer. In Cairo, this Nilometer is situated on al-Rawda Island. In Mamluk times, the Sahib Miyas (the person in charge of the Nilometer) announced to the people of Cairo when the water level had reached the height of sixteen Dhira’. So as to avoid alarming the populace, the Mamluk government sometimes did not reveal the level of water until it had reached sixteen Dhira’ (Al-Nuwayri, 1923). The Nile flood would cover the land to a level of one and a half metres for about forty-five days. As soon as the water receded, it was possible for the peasants to walk across the soil and to begin cultivation. The crops which were cultivated at this time did not need any irrigation other than the flood. They were winter crops.

The Nile has formed two major and distinct areas of arable land in Egypt, namely the Nile Valley in Upper Egypt and the Delta in Lower Egypt. The Nile valley is a narrow strip of land running from Wadi Halfa to the Delta. It is variable in width, but five to six miles is perhaps a fair average. In Cairo, the Nile forms two branches, namely the Rosetta and the Damietta which spread to diverge greatly from each other by the time they reach the Mediterranean Sea. In this way the Delta of the Nile is formed, and within the sides of this triangle is to be found the most fertile soil in Egypt (Cooper, 1977).

The Irrigation System:

Not all agricultural land in Egypt relied on the annual Nile flood. There were also lands that needed the irrigation system since the flood could not reach them because of their elevated position or because they were situated far from the river. In this case, basin systems or artificial methods were required. The basin irrigation system had been in use since Pharaonic times and was an important method of controlling the inundation and irrigation of the fields. The system used canals of various sizes to draw water from the Nile into basins along the Nile Valley and in the Delta. In this method, large basin areas surrounded by dykes were built to trap and store the flood. A canal supplied the waters into the first basin when the Nile was at its height and then the dyke regulator would control and transfer the water from the first basin into the next basins. These basins were flooded to a depth of 1 to 2.5 metres (Borsch, 2000). The water could be held by means of embankments for a longer period (usually for about 6 weeks) before being drained off. The silt sank into the basins and provided a rich fertilizer for the plants. The agricultural value of the land depended on the amount of silt deposited and whether lands were close to the supply of water.

In addition, there were other irrigation systems such as Khuljans (small rivers diverted from the Nile) and canals or waterways which transferred water directly to the fields without using basins. These can still be found in many areas in the Delta. Indeed, there were a number of important canals in Egypt during the Circassian period, including the Khalij Manfi, Khalij Manja, Khalij al-Manhi, Khalij Ushnum Tanah, Khalij Sardus, Khalij al-Iskandariyya, Khalij Dimyat and the Bahr Abi al-Manja. The canals in Cairo and its vicinity were the Khalij al-Qahira, Khalij Famm al-Khur, Khalij Famm al-Dhikr and the Khalij Qantara al-Fakhr (Al-Maqrizi, 1998).

There were two systems of dams controlling the water from the Nile before it could flow into the canals. The first was the Jusur al-Baladiyya (small irrigation dams) which were important for controlling and transporting water from one field to another in the village. The second system of dams was the Jusur al-Sultaniiyya (great irrigation dams) which were constructed for the benefit of the provinces (Al-Zahiri, 1894).
Among the important dams during the Mamluk period was that which controlled the flow of the Nile water to Qarya Umum Dinar in Giza province and that which controlled the flow from Shibin al-Qasr to Banha al-Asal in al-Sharqiyya province. The basin system and the two types of dams (Jusur al-Baladiyya and Jusur al-Sultaniyya) were still in use during the 18th century (‘Abd al-Rahman, 1974).

The irrigation system was, however, very maintenance-intensive. In order to work efficiently it required the consistent dredging of canals and shoring up of dykes. Failure to do this would mean that the Nile flood would wash in and out of the basins without supplying enough moisture or fertilizer. With proper upkeep the canals could expand the terrain of cultivation from the immediate banks of the Nile to large areas of land further away, but without regular dredging the canals were ineffective and the fertile area decreased. Every year, before the arrival of the Nile flood, the canals had to be dug and the irrigation dams constructed and repaired. The wreckage of the walls of the canals and the clogging of waterways had to be cleared, and new networks of canals and ditches had to be laid out. If this was not done, the silt would fill the canals thus making them too shallow. It was important to ensure that the canals were deep enough for a steady flow of water. Similarly, the mouths of the canals had to be cleaned out in order to allow a greater volume of water to flow. Al-Nuwayri (1923) confirms that without such maintenance there would be little benefit from the Nile.

As a result of the crucial importance of the irrigation system to the economic life of Egypt, since Pharaonic times until the medieval period and even today its administration and maintenance have been the responsibility of the state. During the Mamluk period, these tasks were one of the primary duties of the sultans and Iqta’ (the land or rarely the taxes allocated by the great amir or sultan to soldiers in return for military service) holders. Every Iqta’ holder was responsible for the upkeep of the Jusur al-Baladiyya within the confines of his Iqta’. They used their own money from the revenue of the Iqta’ to maintain the dams. Usually the peasants who worked in their Iqta’ would help them in the construction or repair of the dams. For the Jusur al-Sultaniyya, the sultans were responsible for the care of the dam and it was put under the supervision of the Diwan al-Sultan (Sultan bureau). Nevertheless, in practice, the Iqta’ holder assisted the sultan in the construction of this type of dam by supplying peasants, oxen, harrows and other tools (Al-Qalqashandi, 1987).

There was also an office called the Kashif al-Jusur (inspection of irrigation dams) for each province in Egypt. The holder of this office, called the Kashif al-Jusur (the inspector of irrigation dams) and sometimes the Kashif al-Turab (the land inspector), was an amir and normally of Muqaddam Alf rank (amir of a thousand). He was appointed by the sultan and aided by assistants in the construction and maintenance of the irrigation system in the province under his charge.

In addition to these inspectors, the Mamluk sultans also dispatched capable amirs to supervise work on the irrigation dams. The post of supervisor was only temporary and ended after the work finished. Thus, in 1298, Sultan Lajin ordered Amir Badr al-Din Baysara to inspect the irrigation dams in Giza province; on 1 August 1468, Sultan al-Ashraf Qaytbay ordered Dawadar Yashbak to repair one of the dyke canals which was blocked; and in February-March 1516, Sultan Qansuh al-Ghawri sent Amir Tumanbay to inspect Fayyum dyke.

Finally, mention might be made of a tax called Muqarrar al-Jusur (dams tax) which was imposed on the peasants in the Mamluk era and which was used to finance the construction and maintenance of the irrigation system. This tax was levied on the inhabitants of the districts where irrigation dams needed improvement or reconstruction (Ibn Iyas, 1960; Ibn Taghi Birdi, 1932).

Problems in the Irrigation System:

Inefficient management of the irrigation system was another factor which affected agricultural activity and productivity. This has been mentioned by Mamluk historians. Al-Maqrizi (1998), for instance, takes the view that the lack of attention in maintaining the irrigation system was one of the elements which affected Egyptian agriculture. Al-Asadi (1968) also mentions that negligence in digging canals and in repairing irrigation dams was a reason behind the deterioration in the agricultural wealth of Egypt in the 15th century. Elsewhere, the contemporary historian Ibn Iyas remarks that damage to the Abu al-Munajja Dam in 1478 and to Fayyum Dam in 1516 led to casualties and affected the arable lands (‘Ashur 1977).

Indeed, the yield of cereal was in many parts of the Near East (especially Egypt) very much dependent on the efficiency of artificial irrigation, increasing when the irrigation systems were well maintained or improved and decreasing when these systems were neglected. In some places the irrigation system suffered from the corruption of the government officials who were responsible for its upkeep (Ayalon 1988).

During the period under consideration Mamluk chroniclers make a few remarks about the restoration of dykes and bridges by the government. Sometimes, the work of maintenance and repair could not be done on time because the allocation to cover the costs was not enough. Consequently, the peasants could not enjoy the benefits of the irrigation system.

The Mamluk sources also reveal that the costs were imposed on the people. For instance, when the dam in Fayyum was damaged in 1512, the sultan required the peasants and the Iqta’ holders to cover the expenses of repairing it. Amir Arzamak al-Nashif, who was responsible for supervising the work, took the cost from the revenue of their Iqta’s. Shortly before this event, the sultan ordered the Iqta’ holders in Giza province to pay for
maintaining the Umm Dinar Dam. In order to get money from them, he is reported to have stopped payment of the Jawamik (monthly payment) to the Mamluks who owned the Iqta’s in that area (Ibn Iyas, 1960).

Occasionally, funds collected for the irrigation dams (Muqarrar al-Jusur) was misappropriated by the sultan and some high officials instead of being spent on maintenance and construction. Ibn Iyas (1960) reports several examples of corruption which occurred during his time. For instance, in June-July 1511, Sultan Qansuh al-Ghawri ordered Amir Ansibay to supervise the digging of a canal from al-Qantara al-Jadid to Qanatir al-Awz. The sultan ordered the expenses to be taken from the Iqta’ holders and the peasants who would benefit from the project. About 50,000 dinars were collected but only half this amount was spent on the construction, the surplus being taken to the sultan’s treasury.

Work on the irrigation dams was also imposed by corvee on the peasants and civilians. Mamluk historians document that men were often forced to work on repairing canals. For instance, Al-Sayrafi (1970) mentions that Dawdar Yashbak compelled about 2,000 of the ‘Amma (civilians) to work on his dyke repair projects in August-September 1472.

At the end of the Mamluk period, the office of Kashf al-Jusur (inspection of irrigation dams) which was responsible for looking after the irrigation system was not properly run by the amirs. According to Al-Zahiri (1894), the number of Kashifs (inspectors) in this office had initially been three. They had been responsible for the irrigation systems in Upper Egypt, Lower Egypt and al-Giza province respectively. All of these amirs were of Mugaddam Alfi rank (Amir of one thousand) and they were assisted by some officials. This number was increased during Al-Zahiri’s days. Thus, at times there were three inspectors in Upper Egypt and two inspectors in Lower Egypt. The disadvantage of this arrangement, however, was the lack of administrative efficiency. It was difficult for the amirs to achieve unanimity in all matters related to the irrigation system because each of them had his own interests. In this way much of the maintenance work was affected. Ibn Iyas (1960) also mentions some of the corrupt inspectors who forced the Iqta’ holders to pay extra taxes to them. For example, Amir Aqbay, the inspector of Sharqiyya province, was dismissed by Sultan Qansuh al-Ghawri after the Iqta’ holders complained about his nefarious activities.

The results of this inefficiency were apparent. Thus, in 1478, the Abu al-Manja Dam collapsed resulting in casualties and affecting some cultivated lands. In July-August 1509, a dyke in al-Giza province ruptured and damaged the fields. The same thing happened when the Fayyum Dam was damaged in 1516. Inadequate maintenance of the irrigation system also resulted in water not being supplied to the arable land, which meant that some lands were not properly prepared for producing grain. Inefficiency therefore affected the area of land under cultivation as well as agricultural products (Ibn Iyas 1960; Al-Wahaybi, 1998).

The efficiency of the irrigation system was also affected by political unrest. This can be seen especially during the short reign of some incompetent sultans who spent a great deal of time and money putting an end to rebellions caused by amirs, Julban (the royal Mamluks) and the Bedouin rather than concerning themselves with the irrigation system. In concentrating on maintaining their power they almost forgot the importance of this system to the agricultural sector which was the state’s major source of income (Qasim, 1978).

Conclusion:
The Nile is the main factor behind agricultural prosperity in Egypt. The importance of the Nile to Egypt is obvious from an understanding of the climate and geographical characteristics of the country. Inefficient management of the irrigation system was another factor which affected agricultural activity and productivity. This has been reported by Egyptian chroniclers. They mention that the negligence in digging canals and in repairing irrigation dams was a reason behind the decline in the agricultural wealth of Egypt in the fifteenth century. The damage to the dams also led to casualties and affected the arable lands. All of these affected agricultural practice and its produce.

ACKNOWLEDGMENTS
Research for this study was supported by a grant from ‘Arabic Culture and Islamic Civilizational Research Group’, National University of Malaysia (Grant No. UKM-OUP-CMNB-09-38/2011).

REFERENCES


