

Agriculture and Irrigation of Al-Sawad during the Early Islamic Period and Baghdad Irrigation: The Booming Period

Nasrat Adamo¹ and Nadhir Al-Ansari²

Abstract

As time progressed Iraq witnessed the transfer of power from the hands of the Umayyad dynasty in Syria to the Abbasids who established their State in Iraq. The following developments are detailed. During these days very little had happened with respect to land ownership, the question of Kharaj tax and even the agrarian relations between property owners, private farmers and the general peasantry. It may be assumed therefore, that at the start of the Abbasids period all the irrigation networks and infra structures were in good working conditions, and that all the required work force was available as the case had been in the Sassanid and Umayyad periods. The Abbasids may be credited for keeping the vast canal network of al-Sawad in good working conditions and they knew well that the major source of their revenue came from agriculture. Full description of the major canals, which had supplied the lands between the Tigris and Euphrates Rivers. The five main canals or arteries were all fed from the Euphrates and flowed in south easterly direction towards the Tigris where they poured; so naturally they were used for navigation between the two rivers in addition to irrigating all the lands here by vast networks of distributaries and branch canals and watercourses. The major part of these systems was inherited from the Sassanids and the Babylonians but they were kept in good working conditions all these centuries by good management and maintenance. These five major canals according to their sequence from upstream to downstream were called during the Islamic era as, Nahr al-Dujail off taking from the Euphrates at a short distance above Anbar, followed by Nahr Isa, Nahr Sarsar, Nahr al- Malik, and finally Nahr Kutha. The Euphrates River itself bifurcated at its downstream reach to two branches whereby its eastern branch irrigated in its turn a very extensive tract of land in the southern part of al- Sawad with a complex system

¹ Consultant Engineer, Norrköping, Sweden.

² Lulea University of Technology, Lulea, Sweden.

of branches and tributaries. In following each of these canals great deal of details are given on the agriculture of the various districts and the towns they had served, their flourishing conditions and the prosperity they had enjoyed. Khalifah al-Mansour built the new capital of the Abbasid State, Baghdad at the heart of the Sawad region. There was a vast system of watercourses which served Baghdad and its environ that had originated mostly from Nahr Isa is also treated not failing at the same time to describe even the minute details of the various quarters of the city and the markets they had served, which were all based on the writings of contemporary Scholars. The long and deep trench called as the Shabour Trench, which had extended from Hit on the Euphrates down to nearly the Persian Gulf was given its share of detailing as it stood some waterworks, which was meant for defense rather than irrigation. This stream was carrying the major share of flow of the Euphrates during the Abbasids period before it ended indirectly into the Batyiha. It gave however very large branch from its right hand side before reaching the site of Babylon which was called Nahr Nil. This important canal flowed in southeasterly direction and poured at the end in the Tigris in the same fashion as the previous canals did and similarly spreading irrigation watercourses all the way down.

Keywords: Al- Sawad, Early Islamic Period, Baghdad Irrigation, Abbasids, Iraq.

1. Agriculture and Irrigation of Al-Sawad

The rivalry between the *Umayyads* and other Muslim factions over the right to the *Khilafa* had never ebbed during the *Umayyads* dynasty reign (661- 750 AD). The other contenders were the Shiites of Ali, who believed that the *Khilafa* should belong to the descendants of Ali ibn Abi Talib, the fourth *Khalifah* after the death of the Prophet Mohammad, and his cousin and son in law. Others were the *Abbasids* that believed that the right heirs to the *Khilafa* were the descendants of *Al Abass ibn Abi Talib* the uncle of the Prophet. The *Abbasids* rose in rebellion against the *Umayyads* after building coalition with the Shiites and the other disgruntled groups that were mainly the “*Mawalis*”, as the *Umayyads* called the Persians and the eastern Arabs, who were treated differently from Syrian Arabs.

Rebellion erupted in *Khurasan* in *Persia* led by *Abu Muslim Al Khurasani*, who fought the *Umayyads* and defeated them and occupied *Maru*, the capital of *Khurasan*, and established the *Abbasid Khilafa* there. From *Maru*, the head of the rebellion, *Abul Al-Abbas as-Saffah* moved to *Kufa* in August 742 AD, but he remained in hiding till October 750, when he was declared as the *Khalifah of the Muslims*. Final defeat of the *Umayyads* army came just afterwards in the battle of *Zab* in the north of Iraq located between *Mosul* and *Erbil*. The *Abbasids* then completed the conquest of the whole of Iraq followed by *Bilad al Sham* and *Egypt*. *Abul Al-Abbas As-Saffah* captured *Damascus* in the meantime and slaughtered the remaining members of the *Umayyads* family to the last one except for, *Abd al-Rahman* the great grandson of *Khalifah Abdul Malik*, who escaped to *Spain* and continued the *Umayyads* dynasty rule there. By this *Abul Al Abbas* earned the title *As-Saffah* which is the synonym to “*Slaughterer*”, and he became the first *Abbasid Khalifah* and the twentieth *Khalifah* of the Muslims after the Prophet Mohammad, but his rule only lasted from 750 to 754 AD.

After establishing himself as *Khalifah*, *Abul Al- Abbas* moved from *Kufah* and took a new residence in *Hashimiyah*, then moved to *Anbar* where he died. As it had happened before after upheavals and political troubles, the system of land cultivation and irrigation in *Al- Sawad* did not suffer much change during this period for the simple reason that most of the cultivation and maintenance works were done by the *Nabathaeans (Lakhmids)*. Those were the non-Muslim populations that were already there even before the Muslim conquest and who were from *Aramaic* origin, and also by the *Zanj* slaves working for the Muslim landlords who had owned possessions of agricultural lands after the Islamic conquest.

The *Lakhmids* had previously worked either for the *Persian* landlords, or had owned the lands themselves. In such case, the land was left to them by the Muslims as per the conditions of the peace agreement (*Sulh*) on account of their peaceful surrender to the Muslims at the onset of the conquest and conditioned by paying the required (*Kharaj*) and (*al- Jizyah*) taxes. Muslims after the conquest interfered very little with the agrarian organization and left it as it was in the previous days of the *Sassanids*, and even added some reforms, which improved the conditions as far as land ownership and land taxes.

During the *Persian* era, each village had a chief called (*Dahkan*) to which all the peasantry in the village would answer to, and would work for. As the time progressed, Muslim land owners gradually started to appear and the role of the *Dihkans* changed gradually to tax collection^[1]. This arrangement made the continuation of cultivation of the land possible during these transitional periods. Moreover, new lands were reclaimed during the reign of the first four *Khalifahs*, and similarly during the days of the *Umayyads*. This was a direct result of the establishment of the new Islamic cities of *Basra*, *Kufah* and *Wasit*, and the adoption of the (*qati'a*) land ownership system, which encouraged private investment in constructing new irrigation projects.

It may be assumed therefore, that at the beginning of the *Abbasid* period all the irrigation networks and farm structures were in good working conditions, and that all the required work force was available as all these were left to them from the late *Sassanid* and *Umayyads* periods.

After confiscating the lands that belonged to the *Umayyads* and their followers, the *Abbasids* carried out tax collections on all cultivated lands in the same way as the *Umayyads* had done before to finance their new established *Khilafa* State. The *Kharaj* money collection and its spending were the duty of *Diwan Al Kharaj* (the treasury). The collected *Kharaj* was normally spent to pay salaries of the army and the various officials and administrators of the government, and also on the construction and maintenance of public works, in addition to covering the lavish spending on the *Khalifah's* household and building of new great palaces and even new cities such as *Baghdad* and *Sammara*.

Diwan Al- Kharaj had always allocated sizable amounts of money to take care of; irrigation works maintenance, and improved agriculture and even took steps to help farmers by supplying them with seeds, oxen for tillage and the services of engineers and experts in water supply matters, and helping them with loans ^[2].

It was clear that the vitality and existence of the *Khilafa State* depended on *al-Kharaj* money, which was derived from cultivating the vast land of *al- Sawad* and to a lesser extent from the other parts of the state. During the *Abbasid* era, and even before that, irrigated agriculture was practiced all over *al- Sawad* districts while rain fed agriculture was the common method of irrigation in the *al- Jazira* area, north of *al- Sawad*, which extended from Mosul and upwards in the lands between the two rivers. Irrigation from springs and *qanāt* or *karez* was also common in the foothills areas of *al- Jazira* east of the Tigris River. Gravity irrigation, however, was also practiced in *al- Jazira* on the banks of the Euphrates and especially in the *Khabour* tributary districts where agriculture was flourishing and fields and plantations were very dense.

Much writing has come to us from the 9th and 10th centuries, which were considered as the golden period of the *Abbasid* era. These writings were from Muslim scholars and geographers, who wrote their accounts on the various aspects of life of the *Abbasid Khilafa* at that time, which included also their narrations on agriculture and irrigation in addition to describing the newly built cities of *Baghdad* and *Samarra*. The map of Iraq in Figure 49 shows the locations of the five Islamic

cities, *Basrah*, *Kufah*, *Wasit*, *Baghdad* and *Sammara*, which were all built in Iraq during the Islamic period up to and including the *Abbasid* period.

Around these cities, the irrigation systems and cultivated lands were outspread and covered the whole of *al-Sawad* in one continuous green carpet of lush plantations and fields. The same map shows also the main roads leading to other regions, and it indicates the Great Swamp (*Al-Bataih*) that was formed after the famous 628/629 flood of the two rivers, in addition to, the change of the course of the Tigris river after that flood [3].

The irrigation networks of *al-Sawad* described by the Muslim scholars and geographer were already in existence before the *Abbasids* and the *Umayyads*, and a great deal of these canals had survived since the *Babylonian* times under different names. Some other canals were constructed by the *Sassanids*, who made a grand job of this work, helped by the fertility of the delta. Changes had occurred, however, on these networks during this long time due to the changing courses of the Tigris and Euphrates Rivers after great floods. Nevertheless, the full potential of the land was realized most of the time. It is therefore, natural to refer to the writings of those Muslim Scholars when anyone attempts to learn more on the *al-Sawad* geography and its human and agricultural environment during the Muslim era.

Such writers, who may be described as eyewitnesses very close of major events, were many, and we can mention famous names. These are; *Iskharti* (Died in 957 AD), *al-Ya'qubi* (Died in 879 AD), *ibn Hawqal* (943- 988 AD), *al-Maqdasi* (946-991 AD), *ibn Jubayr* (1145- 1216 AD), *ibn al-Mustawfi* (1169- 1239), *Yaqui al-Hamawi* (1179- 1229 AD), and *ibn Batuta* (1304- 1369 AD).

The writings of these scholars give vivid descriptions and rich accounts of the various parts of this region during the *Abbasid* period, and reported especially the great extent of irrigation works that supported agriculture there. *Istakhri* for example, wrote on the dense palm tree gardens around *Basrah* and along its canals. He went on to say that the palm trees' gardens had extended for a distance of fifty *farsakh* from a small village called *Abdasi* at the north east of the great swamp (*Batihah*) to *Basrah* and then down to *Abadan*; he also mentioned the palm trees' plantations along the *Ubullah* canal which extended for a distance of four *farsakh*. In his description of its beauty, he thought of it as being one of the four earthly heavens, while not missing at the same time to mention the other palm trees' groves on the banks of *Ma'kil* canal.

The irrigation system of *Basrah* canals, as were described, had a unique property; since most of the canals were supplied by water twice every twenty four hours when the tide of the Gulf would raise the water level in *Shatt al Arab* and would fill these canals with water, so all the fields and the palm groves were irrigated automatically. Other writings such as those by *al-Maqdasi* mentioned that rice was grown in the shallow parts of the great swamp (*Al Bataih*) and its periphery, which extended up and close to *Wasit*, in addition to the dry patches of land within the swamp itself. *Wasit* itself, by the same account, was very rich in palms groves, gardens and extensive rich fields. In following more of these writings, we come to the description of *Kufah* by *Ibn Jubayr*, who wrote that the eastern bank of the

Euphrates River in *Kufah* had dense groves of all sorts of fruit trees, and in the western bank of the Euphrates, farms and tree groves extended as far as *al- Hirra* and *al- Qadisiyah* on the edge of the desert.

Istakhri again wrote that all the lands between Baghdad at the north and *Kufah* in the south, and from *Dujaela*, the new course of the Tigris after the flood of 629 AD, in the east to the Euphrates in the west, all the land was so crowded with farms and cultivations that it was not possible to distinguish between the different farms, and it was also crowded with towns and villages as well.

All these writers agreed that agriculture had flourished and prospered because of the extensive irrigation canal networks not only in lower *al- Sawad* but also in the areas of *Baghdad* and *Samarra* and to the east from the Tigris River as far as *Hulwan* in the foothills of *Persia*.

To describe the waterworks and irrigation canals that crisscrossed *al-Sawad* from north to south, the course of the Euphrates will be followed from where it enters the delta to where it ends in *Al- Bataih*. The same procedure will also be followed for the Tigris River but not failing at the same time to mention that a great deal of the information on these waterworks are obtained from the writings of *ibn Serapion* and other contemporary authors.

A great deal of these information were compiled and commented upon in G LeStrange book "*The land of the Eastern Caliphate*" which was published in 1905 [4]. The book was based on LeStrange's translation of the Arabic MS which is kept now in the British Museum Library which was written by *Ibn Serapion*, a Syriac author and physician, who lived in the second half of the 9th century, and described Mesopotamia and Baghdad. Moreover, this MS. included references to the writings of many of the Muslim scholars, and geographers mentioned previously, who themselves were contemporary with that period.

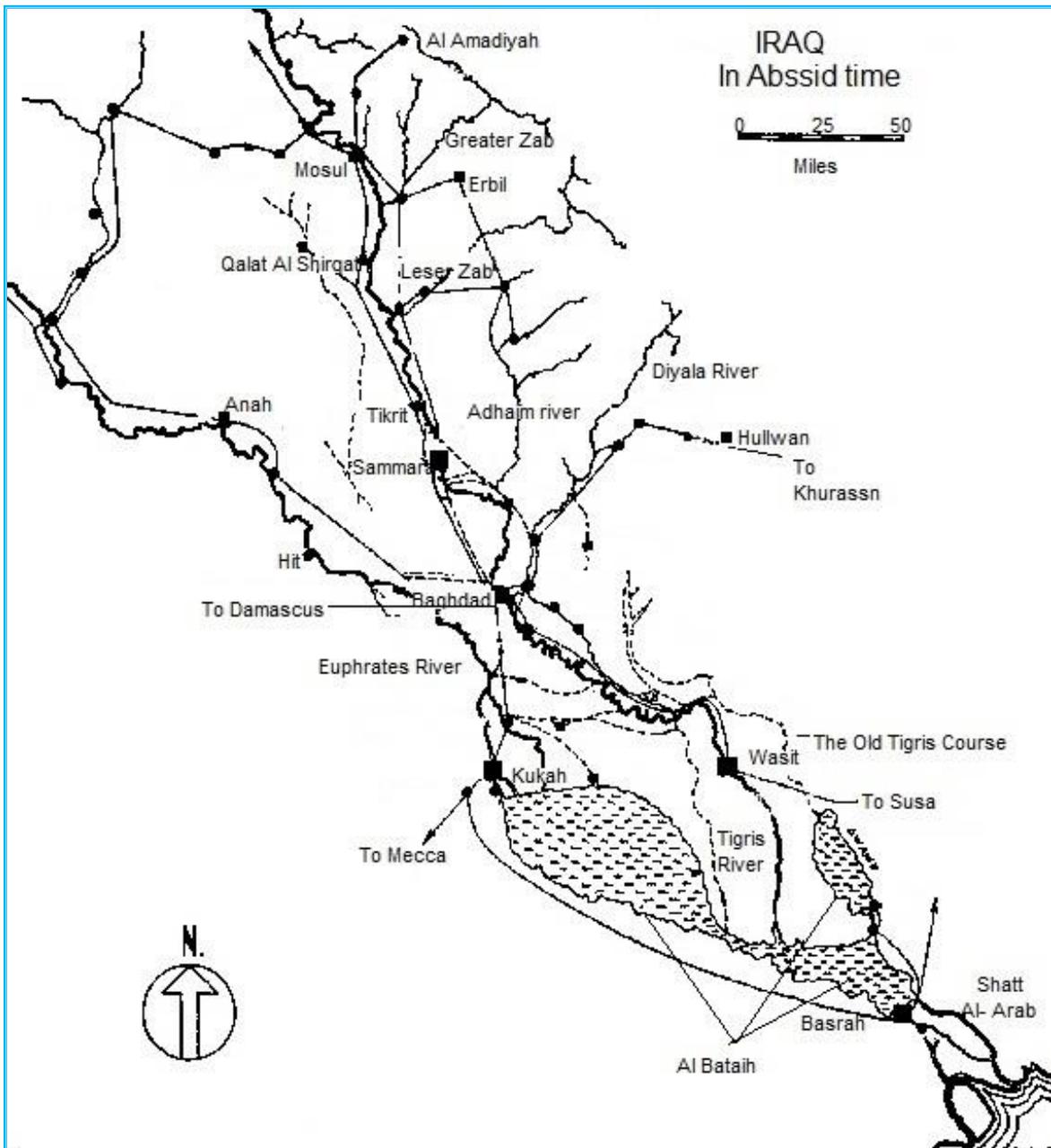


Figure 49: Map of Iraq during the Abbasid time. The map shows the important cities and roads at that time, it also shows the Tigris and Euphrates and Al -Bataih. The map is taken from the book ‘Twin Rivers’ by Seton Lloyd [3]. Many other details are removed by the from the original map by the writer for the sake of clarity.

A straight line carried from the Tigris at Tikrit to the Euphrates would cross the river a little below Anah, where its course makes a great bend, and this is the natural

frontier between *Jazira* and *al-Sawad*, as marked by *ibn al-Mustawfi*. To the south of this line begins *al-Sawad*, or the alluvial land, while to the north lie more stony plains of Upper Mesopotamia. The city of Haditha on the Euphrates, about 35 miles below Anah, is the northernmost town on this side, which *Yakut* had described as possessing a strong castle surrounded by the waters of the Euphrates, and it was founded during the *Khilafa of 'Umer* not long after the Muslim conquest.

Downstream of Haditha the town of Hit is reached, which *Yakut* referred to as a small ancient town that still existed. *Ibn Hawkal* spoke of Hit as a very populous town, and *Ibn al-Mustawfi* in the 13th century described that more than 30 villages were around Hit. He mentioned the immense quantities of fruit, both of the cold and the hot regions, which were grown here; nuts, dates, oranges and egg-plant all ripening freely, but not pleasant to live in on account of the overpowering stench of the neighboring bitumen springs. From the Euphrates at Hit ran the famous trench that was excavated by the *Persian King Shapur II* (309- 379 AD) whom the Muslims called (*Shabour Dhu- l- Aktaf*), meaning (Shapur with the broad shoulders), and according to Arabic literature the trench was also called (*Khandak Shapur*). Sousa, a contemporary Iraqi engineer and historian, casts doubts on the originator of this trench, and claims that its digging may be attributed either to the *Babylonian king Nebuchadnezzar* (605 –562 BC), or the *Persian King Khosrau I Anushirvan*, who reigned during (531-579 AD). Sousa, however, does not produce any evidence to support this claim. He also quotes Sir William Willcocks, the British engineer who had studied the irrigation of Iraq in the beginning of the twenties century of saying that “he had traced the remains of this canal, and it branched from the Euphrates seventeen kilometers south of Hit” [5].

The trench ran all the way down to reach the Gulf at *Ubullah* (near *Basrah*). Originally, it carried water and it was intended as a line of defense for the rich lands of Lower Mesopotamia against the desert tribes.

Our opinion on this issue, however, is; that the trench may have been a prehistoric course of the Euphrates and not a man-made channel, and that it may have been modified for defense purposes. This opinion is reached on account of its huge magnitude and the long distance it traversed down to the Gulf, in addition to the usual historic trend of the Euphrates and Tigris of frequently changing their courses throughout history as they enter the delta region.

Next on the course of the Euphrates was the city of *al- Anbar* “*the granaries*” standing on the left bank of the river. It was one of the large cities of Iraq in *Abbasid* times, and it had dated before the Muslim conquest. It was called “*the granaries*” because the *Persian* kings had stored the wheat, barley and hay for the rations of their troops in the city. The first *Abbasid Khalifah Abul Al- Abbas as-Saffah*, had for a time made Anbar his residence, and he died in the palace which he had built here. His brother and successor *Abo Jafar al-Mansur* lived also for a short time at Anbar, and from here he moved to Baghdad; the new city he built and made it the new capital of the *Islamic Khilafa*.

At the time of building Baghdad there had been already one large canal, which branched from the Euphrates at a point about twelve leagues (58km) downstream

from Hit. This canal was called (*Dujail Canal*) which should not be confused with the other *Dujail* canal that branched from the right bank of the Tigris near Tikrit, which ran all the way down to reach Baghdad itself.

By the close of the 10th Century, and according to *Iskharti*, this *Euphrates- Dujail* canal had already silted up in its uppermost portion so the remaining lower reach ceased to receive water from the Euphrates. This had required the digging of a short channel taken from the *Tigris- Dujail* to connect to the lower reach of the *Euphrates- Dujail* in order to continue the irrigation of the district called Maskin north of Baghdad and cover the needs of the *Harbiyah Quarter*, the northern districts of western Baghdad in the same way that the *Euphrates- Dujail* was doing before.

Going down further south the next canal branching from the Euphrates was the grand *Nahr –Isa Canal* that had its intake at a little distance downstream from *Dujail Canal* offtake and flowed in a parallel course in the direction of Baghdad. These two canals provided Baghdad and surrounding fields, farmlands and date- palm groves with abundant water supply, as will be explained in details later on.

The round city of Baghdad which was the original core of western Baghdad, was built by *Khalifah al-Mansur* in (762–767AD) as the official residence of the *Abbasid* court. The significance of the site of the new city was in the availability of abundant water and the decrease of the dangers of flooding. This in turn led to the expansion of the city and increased its influence. Providing a bridge across the Tigris River here had provided a good link with the left side of the river and continued communication with the eastern parts of *al- Sawad* all the way to *Hulwan* in *Persia*. The Tigris penetrated the city and divided it into two parts *Karkh* (western part) and *ar-Rusafa* (eastern part) ^[6].

The original round city had three concentric walls, and an outer deep moat filled with water, four equidistant gateways being left in each of the circuits of the walls. These were, *Basrah gate* (SE), *the Kufah gate* (SW), the *Khurasan gate* (NE), and *the Syrian gate* (NW). The first two of these gates opened on the *Sarat canal*, which branched from *Nahr Isa*, while the third gate, which was on the Tigris led to the main bridge of boats; and the last led to the high road to Anbar on the Euphrates.

Unlike the *Greek*, *Roman*, and *Sassanid* kings, who named cities after themselves, *al-Mansur* chose the name *Dar al-Salam* or “*Abode of peace*,” a name alluding Paradise. Furthermore, he did not object to the use of the ancient city name “*Baghdad*,” although many people used to call it the city of *Al-Mansour*.

The city gained later on many more appellations, including *al-Mudawara*, meaning around city, because of its circular form, and *al-Zawarh*, meaning the winding city, because of its location on the winding banks of the Tigris. But one of the main reasons of getting the city its present name was that *Abo Jafar al-Mansur* had built the city in the location of the village which was known as (*Baghdad*) since the days of *Hammurabi*.

The name “*Bjaddada*” appeared on a clay tablet dating back to the eighteenth century BC, and in days of *King Hammurabi* “*Baghdadi*” was the name of the same place which appeared on another clay tablet dating back to (1341- 1316 BC). On

another tablet the name “*Bjaddado*” again appeared in a historical document from 728 BC during the reign of the *Assyrian king Tglat Flasar III* of (727- 745 BC). The location of the city was of very high strategic value being right at the center of Mesopotamia. It was therefore, a meeting place for caravan routes on the roads to *Khurasan* and *Bilad Al-Sham (Syria)*. It had a system of canals that provided water for cultivation and could be used as ramparts for the city; moreover, it also had adequate drinking water supply for the people and provided an environment more or less free of malaria ^[7].

These considerations must have contributed to the choice of this site as explained by LeStrange in the following statement:

“The new capital would then stand in the center of a fruitful country, not on the desert border, as was the case with Kufah and the neighboring towns, for the barren sands of Arabia come right up to the bank of the Euphrates. By a system of canals, the waters of the latter river were used to thoroughly irrigate and fertilize all the country laying between the two great systems, and while the waters of the Tigris were kept in reserve for the lands on the left Persian bank; and thus the whole province, from the Arabian Desert on one side to the mountains of Kurdistan on the other, was to be brought under cultivation and converted to a veritable garden of plenty. Lastly, the Lower Tigris before its junction with the Euphrates was more practical for navigation than this latter river, inasmuch as the great irrigation canals, by effecting drainage of the surplus waters of the Euphrates into the Tigris, scoured the lower course of this river, and kept the waterway clear through the dangerous shallows of the Great Swamp immediately above Basrah estuary ^[4].”

Nahr Isa, which in addition to its abundant water was at the same time the first navigable canal from the Euphrates to the Tigris. So the town of *Anbar* gained more importance due to the fact that it was laid in its position on the head of the first navigable canal that flowed from the Euphrates to the Tigris, which it entered at the harbor (*Al-Fardah*) in Baghdad. *Nahr Isa* took its name from an *Abbasid* prince, *Isa*, who was either *Isa ibn Musa*, a nephew of *al- Mansur*, or *Isa ibn Ali* (the more usual ascription), the uncle of *al- Mansur*. In either case, *Prince Isa* gave the canal its name; he has re-dug it, had also enlarged it, making it thus a navigable canal from the Euphrates into Baghdad.

The canal was excavated originally during the *Sassanid* era for irrigation purposes only, and some sources mention that its original name was *Tabik Kisrawi*, and that it was dug by a *Persian* whose name was *Babik ibn Bihram ibn Babik* ^[8].

Where the canal had left the Euphrates, a short distance below *Anbar*, it was crossed by a bridge called (*Kantara Dimmima*), near the village of the same name, close to the hamlet of *al- Fallujah*, then it came after some distance to the town of *al- Muhawwal*, one league (about 4.8 kilometers) distance from the suburbs of west Baghdad. At this point, an important canal branched from the left side of the *Nahr Isa*; which was called the *Nahr Sarat*.

Another important canal branched from the right side of *Nahr Isa* about one mile below the *al-Muhawwal* town, which was the *Karkhaya canal*. According to the description of *Ibn Serapion*, the *Karkhaya canal* was great loop canal supplying

water to the other secondary canals that traversed the *Karkh* district of west Baghdad, and it is said to have been dug at the time of the foundation of Baghdad by *Isa* (the uncle of the *Khalifah*). The canal, after giving five branches from the left side and one from the right, discharged its remainder back into *Nahr Isa* canal. The five left-hand branches just mentioned were supplying the various quarters of the city and they were called *Nahr Razin* or *Nahr Attab* in its lower course, *Nahr Bazzazin* (*Canal of Cloth-merchants*), *Nahr-ad-Dajjaj* (*the fowls' canal*), and *Nahr-Kilab* (*the canal of dogs*). The sixth branch which took its water from the right side was called *Nahr-al Kallayin* (*the canal of Cooks who sold fried meat*)^[9].

In its upper reach, *Karkhaya canal* was a broad canal that needed to be crossed by arched stone bridges (*Kantarrah*), the lower branch canals, and the watercourses of *al-'Amud* and the *Tabik* were evidently much smaller water courses, since no such bridges were needed for the high roads to cross them. Many more watercourses were then dug within west Baghdad for its water supply system; dykes and reservoirs were built and even drains to drain the swamps around Baghdad, freeing the city of malaria^[10].

It may be said therefore, that water for irrigation and municipal use for the *Karkh* area (western Baghdad outside the round city), was supplied from the canals which branched from the Euphrates, and only some parts in the northern edge of the city were supplied from the Tigris. A clear idea of the density of these canals may be obtained by referring to Figure 50.

Now if we go, back to *Nahr Sarat* canal which was already mentioned, which branched from *Nahr Isa* upstream from *al-Muhawwal*; this canal formed along its course the dividing line between *Katrabull* district to the north and *Baduraya* to the south of the west Baghdad area. Generally, it ran south of *Nahr Isa* and parallel to it and after one league (about four kilometers) from its off-take it bifurcated into two branches. The left branch was called *Khandaq Al-Tahir* (*Trench of al-Tahir*), which after a short distance fed another canal on the right side called the *Little Sarat*, which finally, after watering the adjacent district, poured back in the main *Sarat Canal*.

Both the streams of *Nahr Isa* and the *Nahr Sarat* poured their remaining water back into the Tigris immediately below the *Basrah Gate* in two separate ports, which were the *Upper Fardah* and the *Lower Fardah*. The map in Figure 51 shows the canal networks serving both western and eastern quarters of Baghdad.

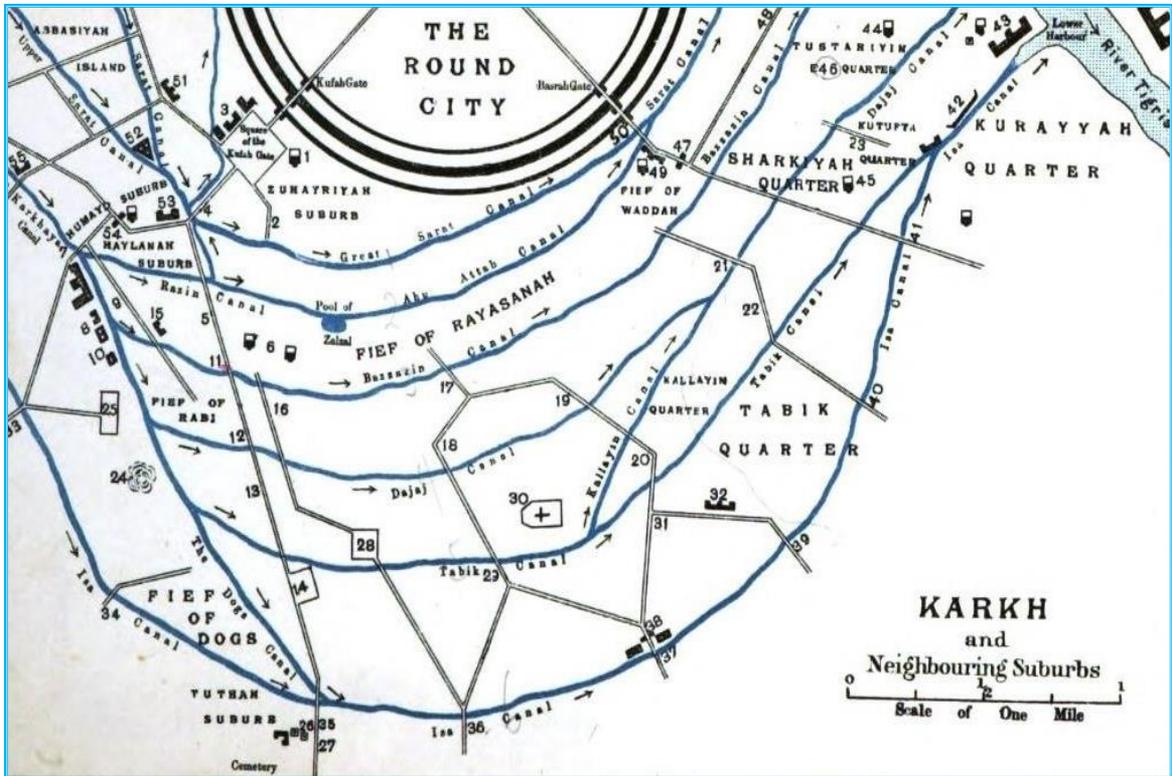


Figure 50: Canals and Watercourses of Karkh neighboring suburbs [9].

gardens, and as late as the 14th century possessed some significant buildings. The exact site of *al- Muhawwal* is not known, but it must lie to the north-east of the ancient *Babylonian* mound called the Hill of “*Akarkuf*,” which is frequently mentioned by the Arab geographers [4].

Dealing with the question of drinking water supply of Baghdad, *al-Tabari* quoted other writers of how things were going about in solving this matter. LeStrange confirmed *al- Tabaris*'s account, whereby water was carried, in the beginning, on the backs of the pack- mules filled in leather bags of goatskin and delivered to the population and even to *al- Mansur* palace. Later on *al- Mansur* commissioned his uncle ‘*Abd- as Samad*, to lay a conduit to bring water direct from outside the *Khurasan Gate* to the palace tanks.

This work ‘*Abd- as Samad* successfully accomplished, making the conduits of teak wood (*Saj*), and the *Khalifah* improved on this by digging permanent watercourses from both the *Dujail Canal* and the *Karkhaya Canal* thus bringing a plentiful supply of water into the palace and other parts of the Round City. The beds of these new watercourses were laid in cement, and they were arched over throughout their whole length with burnt bricks set in mortar, so that during both summer and winter water never failed in any street or quarter in the city of *al-Mansour*.

Development of many new quarters around the Round City occurred rapidly after the construction of the city itself and the density of population in these new residential and commercial parts increased also, especially after *al- Mansour* had ordered the removal of the markets to *Karkh* outside the Round City. This led to the construction of the large network of canals and watercourses such as to penetrate to all the living quarters and groves in *Karkh* [4]. [9]. Unfortunately, we have not received any account from the geographers and scholars who wrote on Baghdad telling us exactly which of these canals and watercourses were used to supply drinking water and irrigation water, and which of them were drains to remove the surplus water from the other watercourses. It is not possible that one canal can perform the dual functions and this will remain obscure unless some new findings would explain this matter [11].

Baghdad, soon after its establishment, and as usual for lively and prosperous cities grew in population and built up area, so it extended to occupy the left bank of the Tigris after *al- Mansur* had established there an encampment for the troops of his *son al- Mahdi*, and built a large palace for him and large Mosque. This new quarter was named *ar-Rusafah*, which was surrounded by a wall for its defense. This work opened the way for many influential people to build palaces, and for other people to build their homes and establish many markets (*Suqs*). The water supply to the eastern side of the city, however, was obtained from the Tigris River through tributaries of the *Grand Nahravn Canal*, which originated from the Tigris River eastern bank downstream from Tikrit at the upper edge of *al-Sawad*. (More details on this canal, its tributaries and the dense canal network which supplied all the area east of the Tigris River, including east Baghdad will be discussed in details in the next paper, but the map already shown in Figure 51 indicates those tributaries feeding east Baghdad in addition to the other network which were serving west

Baghdad.

Now Leaving Baghdad and its dense network of channels and watercourses, and continuing down along the Euphrates, we come to the third large transverse canal called *Nahr Sarsar*.

This canal branched from the Euphrates at a point three leagues (about 15.5 km) below the village *Dimmima* already mentioned. Its course was in the direction towards the Tigris in a similar fashion as the other canals, and also poured into it at a point four leagues (19.2km) above Madain which was located on the opposite bank. According to Sousa, the course of *Nahr Sarsar* at that time was in the same direction that is followed by modern days Abu Gharib canal ^[5].

Nahr Sarsar canal, in its lower reach, crossed the *Baduraya* district which was south of west Baghdad. *Ibn Serapion* described the numerous waterwheels (*daliyas*) and levers (*Shadufs*) which were set up along its banks for irrigating the fields and orchards. This gives clear indications that the irrigated land in that part was higher than the canal water level. At a point some distance above *Zariran*, which was almost in sight of the white palace of *Khusraw* at *Madain*, this canal, poured out into the Tigris.

The flourishing town of *Sarsar* from which the canal took its name was located where the great bridge of boats carrying the *Kufah* road crossed the canal, and the town was about two leagues (about 10 km) only from *Karkh*, the southern suburb of west Baghdad. The canal as described by *ibn Hawkal* was navigable for boats, and the town stood in a forest of date-palms ^[4]. According to the same scholar he described the land of *al- Sawad* between Baghdad and *Kufah*; that it was crisscrossed by multitude of canals, and watercourses, which were fed from the Euphrates in such a way that it was difficult to distinguish these canals one from the other and the land that was served by *Nahr Sarsar* canal was no exception ^[5].

Following the same pattern of branching from the Euphrates, the next transverse canal was *Nahr al- Malik*, which began at the village of Falluja five leagues (24 km) below the head of *Nahr Sarsar Canal* and flowed into the Tigris three leagues (about 14 km) below *Madain*. *Nahr al- Malik*, or the “King Canal,” actually had existed from the times of the *Chaldeans of Babylon* or even before that and was specifically mentioned by the Greek historian Herodotus. On this canal he had said:

“*Nahr Malcha; it is the largest Babylonian canal which ran to the east and could be navigated through by large ships*”.

This description and other historian’s accounts show clearly that it belonged to the *Chaldeans* era of *Babylon*. Referring back to the description of the hydraulic works of the great *Chaldean* king *Nebuchadnezzar* given in Paper 5, the following was stated:

“*He excavated four canals across the land, to unite the Tigris and Euphrates. The width and depth of each canal were enough to carry merchant ships, and branching into a network of smaller canals and ditches for irrigating the fields. In order to fully control the increased mass of waters which he thus obtained, Nebuchadnezzar had created a huge basin or reservoir near Sippar on the left bank of the Euphrates by flooding the present day depression of Akarkuf, which was*

according to the description of Herodotus some thirty- five miles in circumference and as many feet in depth, even though, other writers gave higher figures. Water was supplied to the reservoir by a very large canal which had existed already or re-excavated by Nebuchadnezzar. Stored water in the reservoir during flooding season was released to the Euphrates in the low water season. This canal was called “*Nahr Malka*” or the Kings River”.

This means that not only *Nahr Malik* was dug by the *Chaldeans* but all the other canals already described belonged to the *Chaldean era*” [12].

Yakut reported that tradition gave it that *Nahr al- Malik* as having been dug either by *King Solomon* or by *Alexander the Great*. The remnants of this canal are currently observed close to the present day al- Radhwaniya canal according to Sousa [13].

On the banks of this canal the town called *Nahr al-Malik* was located, seven miles south of *Sarsar*, and according to *Ibn Hawkal*, the town was a large and fine town, being, likewise, famous for its corn and palm groves. *Mustawfi* added to this that over 300 villages were of its district.

Nahr al-Malik town which was also called (*Daskarah*) was about five leagues (24 km) west of Baghdad, it was on the bank of *Nahr al-Malik* from which it took the name. It was dated to the pre Islamic era, and it was populated afterwards by Muslims and the Persians and Jews who had lived here before but converted to Islam after the conquest during the reign of *Khalifah Umar*. *Nahr- al Malik* town or *Daskarah* was famous for its great wealth derived from agriculture and animal husbandry, so the population worked either in farming and breeding cattle and sheep, or were traders exporting the surplus of all their products to other towns and villages. In one story attributed to *Yakut*, he had mentioned a man called *Dabes ibn Sadaka* as being such an important and wealthy trader and *Dahkan*, who had ordered his men to herd more than hundred thousand of his animals, presumably to be sold elsewhere. During the *Abbasid* times, this area was also used as hunting place by the *Khalifes* due to the abundant game that took a refuge in its thick groves [14].

The next major transverse canal, which was supplied by the Euphrates, was the *Nahr Kutha*, which had its intake at a point three leagues (about 15 km) below the head of *Nahr al-Malik*, and it poured into the Tigris ten leagues (48 km) below *Madain*. The *Kutha canal* watered the district of the same name, which was also known as the *Ardashir Babgan* district, after the first *Sassanid king* (224-242 AD), though part of it was counted as the *Nahr Jawbar* district, which was watered from a canal branched from *Nahr al-Malik*.

On the banks of this canal stood the city of *Kutha Rabba*, with its bridge of boats, it was described by the 10th century *Ibn Hawkal* as a double city, *Kutha at-Tarik* and *Kutha Rabba*; and he claimed that the last was a city larger than *Babylon*. The first archaeologist to examine the site was George Rawlinson (1812–1902) who had uncovered a clay tablet of king *Nebuchadnezzar II* of the *Chaldean Empire* mentioning the city of *Kutha*. Today the site of *Kutha* is marked by a 1.2 kilometer long crescent shaped main mound with a smaller mound to the west. The two mounds, as typical in the region, are separated by the dry bed of an ancient canal,

and this site is called nowadays the Tell Ibrahim. The site was dug again in (1881) by the Iraqi archeologist and scholar Hormuzd Rassam (1826-1910) for four weeks but little was discovered; mainly some inscribed bowls and a few tablets ^{[15], [16]}.

A little to north of *Kutha Canal* stood the large village of *Al-Farashah*. On the half way stage between Baghdad and Hilla. *Ibn Jubayr*, who was here in (1184 AD), described it as the populous well-watered village, where there was a great caravanserai for travelers, defended by battlemented walls, and *Mustawfi* also gave *Farashah* in his itinerary, placing it seven leagues (about 35 km) south of *Sarsar*. The excavation of *Kutha Canal* and the other aforementioned canals are attributed to the great *Chaldean* king *Nebuchadnezzar* according to the Greek historian *Xenophone* who described them as;

“being as wide as a hundred feet, and as so deep that they carry even corn ships, and for the construction of canals palm trees had to be felled all along their rout” ^[17].

Therefore, the whole area served by *Kutha Canal* was well developed much before the *Abbasid* time, and even earlier than the *Persian* era. The continued habitation and cultivation of the land for such a long period is a clear sign of its fertility and the continuous mention of it in historical document is another indication of this important fact.

Below the *Kutha Canal*, at the lower Euphrates region, irrigation canals had a different pattern of spreading than those in the middle Euphrates, for these canals had to adapt to the continually changing river course, which was characteristic of this alluvial river here during history. The topography of the land between the Tigris and Euphrates had also its impact on having some of the major canals flowing into the swamps south of *Kufah*, rather than the Tigris, which was the case of the *Kutha Canal* and other major canals already, described.

The Euphrates River course had experienced many changes during history and one of the works of *Alexander the Great* during his stay in *Babylon* was solving the problem of the *Pallacopas* (described in paper 6). This was to enhance the flood routing conditions of the Euphrates and solve the problem of the reduced water level in *Babil River* on which *Babylon* was located (Shatt al- Hillah of today). The *Pallacopas* however, had developed at a later stage into the major branch of the Euphrates (Shatt al- Hindiyah) on which *Kufah* was built just after the Islamic conquest. The same thing was experienced at the late years of the 19th century so it prompted the Ottoman Government to construct the Hindiyah barrage to solve the problem which had resulted in reducing the flow in the other branch (Shatt al- Hilla). This government had enlisted the service of the well-known British engineer, Sir William Willcocks, who designed and oversaw the construction of the well-known Hindiya Barrage which was completed then in 1913 ^[18].

In the 10th century, however, the two Euphrates branches bifurcated at a point some six leagues (29 km) below where the *Kutha Canal* was led off. The western main branch, to the right, or the *Kufah* branch, presumably the old *Pallacopas*, passed down to *Kufah* poured hence into the *Great Swamp* in the manner that was meant to be in the *Alexander's* works, whilst the eastern branch, to the left, was called by

Ibn Serapion and the other Arab geographers, as the *Nahr Sura*. This is the Shatt al-Hillah of today and the *Babil River* as it was called during the *Alexander* time. From the upper reach of *Nahr Sura canal*, many areas were watered directly. These were the districts of *Sura*, *Bisama* and *Barbisama*, which formed parts of the middle *Bih Kubadh* district, then in continuing southwards the canal passed a couple of miles westwards of the city called *Kasr Ibn Hubayrah*. Here it was crossed by a great bridge of boats known as the *Jisr Sura* or (*Suran*) by which the pilgrim road went down from *Kasr Ibn Hubayrah* to *Kufah*. The town of *Al Kasr*, as it was called for short, meaning the *Castel or Palace of Ibn Hubayrah*, took the name, from its founder, who had been governor of Iraq under the *Umayyad Khalifah Marwan II*. Later on the first *Abbasid Khalifah al-Saffah* took up his residence here for a short time and called it *Hashimiyah* in honor of his own ancestor *Abu Hashim*, before he moved to *Anbar*. The *Khalifah al-Mansur* was also said to have resided in *Hashimiyah* before he moved to *Anbar* then to Baghdad, which he had built. In the 10th century, *Kasr ibn Hubayrah* or *Hashimiyah* was the largest town between Baghdad and *Kufah*, and it stood on a loop canal from the *Sura*, called “*Nahr Abu Raha*” or “*Canal of Mill*.”

At a point above *Babil*, the *Surat Canal* gave a large branch which flowed towards the Tigris and irrigated large tract of fertile land, and it was called the *Nahr Nil Canal* or the Shatt- al- Nile of today. *Ibn Serapion*, however, had called this canal in his writings as the “*Great Sarat*,” which should not be confused with the “*Sarat Canal*”, the other canal which irrigated Baghdad and mentioned earlier. It may be added that *Nahr Nil* waterway was the last of the group of canals, which emptied in the Tigris, and we shall discuss more of it after we follow the course of the main *Surat Canal* itself.

So the *Surat Canal*, after it gave water to *Nahr Nil* it continued in its course southwards and passed by the ruins of *Babylon* on its left, and then after few miles passed through the city of Hilla “the Settlement”, which was called then “*Al-Jami’an*” or the “two mosques”.

This town was a populous place, and its lands were extremely fertile. The town itself was built on the right bank by *Sayf- ad- Dawlah*, chief of *Bani Mazyad*, in about 1102 AD before it extended to the left side also. The city as geographers described it was surrounded by date palms groves and hence had a damp climate, and that it had quickly grown in importance, as it was located on the road from Baghdad to *Kufah*. As the *Surat Canal* continued down from *al- Jami’an* (Hilla) for another six leagues (29km) and according to *Ibn Serapion* it bifurcated. The main right arm going south was kept the name of the main canal *Sura*, while the left arm was called *Nahr an-Nars*, which turned off to the south- east, this after watering “*Hammam Umar*” and other villages reached the town of *Niffar*. This canal took its name from *Nars* (or *Narses*), the *Sassanid king* who came to the thrown in 292 AD. Both the *Sura Canal* and *Nahr an- Nars* poured their waters afterwards into *Badat Canal*, which traversed the north limit of the great swamp. The *Badat Canal* was a drainage canal which branched from the left bank of *Kufah* arm at a point one day journey north from *Kufah*, probably near the town of *Al- Kanatir*.

Nevertheless, going back to the *Nahr an-Nil*, the main branch of *Surat*, which was mentioned in the beginning; this branch continued to serve its purpose up to the present days under the name of *Shatt- an- Nil*. From its point of origin the *Nahr an-Nil Canal* or the “*Great Sarat*” flowed eastwards past many rich villages, throwing off numerous water channels and shortly before reaching the city of *al-Nil*, a loop canal, the *Sarat Jamasp*, branched from its left and rejoined the main stream below the town.

This loop canal had been re-dug by *Hajjaj*, the famous governor of Iraq during the *Umayyad Khilafa*, who was also the founder of the town itself, but the loop canal took its name, from *Jamasp*, the chief fire priest, who in ancient days had aided *Gushtaps* to establish the religion of *Zoroaster* in *Persia*.

After watering all the surrounding districts, *Nahr an-Nil Canal* came to a place called “*al- Hawl*” which was the lagoon near the Tigris opposite *Nu’maniya* where a branch called *Upper Zab* branched from its left side and poured its water into the Tigris. But the main course of *Nahr an-Nil* turned here to the south and flowed for some distance parallel to the Tigris down to a point one league (about 5 km) below the town of *Sabus* which lay one day’s march above *Wasit*. Here the canal finally discharged its waters into the Tigris. The lower reach of the *Nahr an- Nil* was known as the *Nahr Sabus* in reference to the town of *Sabus*, although some geographers had called this reach as the “*Lower Zab.*” *Yakut* in the 13th century reported that both canals had, however, gone much to ruin, though they bordered fertile lands [19]. From the foregoing, we learn that most of the *al-Sawad*, between the two rivers, even from ancient times, was irrigated mainly from the Euphrates. The ancient people of Mesopotamia made use of the flat topography of the land and its slope from the Euphrates in a southeastern direction towards the Tigris.

The Tigris in this whole reach acted as a drain; the only exception was south of Kut where the land below it sloped in southwestern direction. In this way, the major canals of the Euphrates were the arteries of the intensive canal networks that covered every piece of land in lower *Sawad* between the two rivers.

The Tigris River, however, was mainly the source of water for irrigating the lands on its left side as far as the foothills of *Persia*. The Irrigation of this vast tract of land which extended from downstream of Tikrit to Kut was done by the *Great Nahrawn Canal* in addition to the Adhaim and Diyala Rivers which were acting in interaction with the *Nahrawn Canal* by irrigating lands above the *Nahrawn* canal course. Other canals from the Tigris; the *Dujail* and *Ishaqi*, also played an important role by irrigating the districts north of Baghdad directly from the Tigris. These canals and their related hydraulic works are discussed in paper 9 and paper 10.

The great canal systems were kept in good working condition to a late date during the *Abbasid Khilafa*. This was only possible as a result of the *Persians*, *Umayyads* and the *Abbasids* attention which they had paid to them. They knew very well that these canals were the source of most of the revenue on which their empire’s livelihood depended; as without them agriculture could not flourish and give the abundance they had managed to have.

The land of Mesopotamia that was also called *al- Sawad*, as seen from historical records and archeological discoveries, was densely populated. *Babylon, Seleucia Ctesiphon, Basrah, Kufa, Wasit, Bagdad and Sammara*, were the large cities and capitals of Mesopotamia during its long history, and so they were the centers of trade and wealth of the successive empires that had dominated this land at their times. The main rivers and the network of canals supplied these cities with their needs of water. In the case *Basrah* and partially of Baghdad, dug canals supplemented the drinking water supply that was drawn from the rivers. Fortunately, the many manuscripts left to us by the scholars and geographers, Muslim and others, are rich in the description and details of agriculture and irrigation throughout the ancient times and Islamic era.

The Arabic manuscripts describing *Basrah* and Baghdad canals and the other major canal networks of both Euphrates and Tigris were translated to English by western scholars since the late nineteen century and were published in the Journals of the Royal Asiatic Society of Great Britain and Ireland and the Royal geographical Society of London, and even in large volumes of books were written by travelers who inspected the remnants and ruins of these canals and provided great deal of details shedding light on these great works. One very important example, which is worth referring to, is the translation of *ibn Serapion* MS which was done and commented upon by LeStrange and published in (1895) ^[20].

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