



## Water System during Safavid Era

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**Abstract:** *During Safavid era, as in the times of the other dynasties before, agriculture has been mentioned as the primary source of income. The present study aimed at investigating the irrigation system in the geographical extents of Iran during the governance of Safavids Dynasty. The special climatic and geographical situation of Iran and aridness and water shortage and consequently Iranian civilization's large dependency on water and hydraulic structures (particularly aqueduct or water canal) are defined as the most important factors of agriculture's development and scattering in Iran. The present study sought succinctly investigating the irrigation system as the main subsystem of agricultural system as well as exploring its evolution trends in Iran during Safavid era through studying its traditional systems based on the library documents and evidence.*

**Keywords:** *Safavids, Water, Agriculture, Geography.*

### INTRODUCTION

The advent of Safavids during 16<sup>th</sup> century (10<sup>th</sup> hegira century) marks the emergence of a modern period in the history of Iran. Politically, Iran has gained the possession of a national government (possibly in its today's sense) and Twelver Shiism is established as the formal religion but the issue of land and water incorporates novel concepts in this period and it is continued till the later periods.

One of the most important problems of Iran Plain, especially in the agriculture sector, is the water shortage. The lack and shortage of water has caused a vast part of Iran's central plain to be turned into a dry desert without any plants; the population and civilization scattering on Iran Plain has also been a function of the amount of available water. Such difficulties compelled Iranians to devise strategies and find solutions for improving the irrigation methods, amongst which, surface irrigation, exploitation of groundwater and, more importantly, digging of aqueduct and well can be pointed out.

### Geographical Realm of Safavid Kindship

The government that was founded by Shah Ismail I encompassed Iran's new territories with specific identity elements and geographical demarcation of the borders within which various tribes and cultures had been accommodated; these states and borders constituted a domain that could be possibly termed empire.

Iran's Georgia was in the northwest of Safavid Empire and in between Caucasus Mountains to the northern border with the centrality of Tbilisi. Iran's Georgia was ruled by the governors including "Kartili" princes in the northwest and "Kakhti" princes in the south. The governor was sometimes selected from Kartili race and

occasionally from Kakhti Tribe. Tbilisi was the capital of Georgia and, in the meanwhile, center of Kartili (Lawrence, 1985).

The vast state of Azerbaijan was in the southwest of Georgia with cities like Chekhor Sa'ad (Irvan), Nakhjavan, Qarabaq, Ganjeh, Ardabil, central Tabriz and Biglar Beyg-ruled Azerbaijan. Of course, Chekhor Sa'ad with the centrality of Irvan and Qarabaq with the centrality of Ganjeh had their own independent Biglar Beygs [governors] (Claus, 1970). The governor-ruled the state of Kurdistan or Ardalan with the centrality of Sanandaj which was in the south of Azerbaijan. This state was limited in the south to Kermanshah State with the centrality of Kermanshah as the main route from Baghdad to Qazvin thence to Khorasan.

The large state of the Non-Arabs' Iraq was in the eastern side of Kurdistan and Kermanshah and it was previously called "Al-Jibal" (Mostawfi, 1983). Besides Isfahan, the non-Arabs' Iraq embraced states like Ali-Shokr (Hamadan) realm, Qazvin, Tehran, Qom, Saveh, Kashan, Natanz, Na'ain, Ardestan, Abarkuh, Qomsheh, Chahar Mahal, Khansar, Golpayegan, Mahallat and so on (Lawrence, 1985).

Lorestan's mountainous governor-ruled state was in the southeast of Kermanshah with Khorram Abad in the land of "Fiuli Lors" having been its capital. The governor-ruled Arabia (Khuzestan) state was in the southern section of Lorestan; as written in Dastur Al-Moluk, it has been larger and higher in terms of numeroisty of tribes and nomads than the other governor-ruled states. Governorship has been hereditary in this state and held by Mosha'asha' Family, founder of the Arabian Mosha'asha'eiyen Dynasty as the descendants of the great prophet of Islam (may Allah bestow him and his sacred progeny the best of His regards) (Muhammad Rafi'e Ibn Hasan Mirza Sami'a, 2006).

The great Bakhtiari tribe resided the mountainous region in the east and northeast of Khuzestan but its chieftain had not yet reached the rank of governorship. It was so until the late Safavid Era that the tribe gained prestige and importance and ranked second after Georgia's governorship. The mountainous state of Kohgiluyeh and then the large state of Fars was in the adjacency of Bakhtiari soil. This state had been stretched from the top of Persian Gulf to Hormuz Strait with Shiraz being its capital and Gambroon Port being one of its cities (Lawrence, 1985). Kerman or the old "Karmania" was positioned in the southeast of Fars with its capital having the same name. On the east, Kerman was limited to the vast plains of Kavir-e-Lut that separated it from Sistan State.

Land of Makran was in the southeast of Kerman and it was stretched to Baluchestan region which was itself extended on the east to India's Mongolian Empire and resided by Baluch Barahuni Tribes (Lawrence, 1985).

Safavid Empire encompassed the large Khorasan that was stretched to Marv on the east. The most important cities of Khorasan were Mashhad, Herat, Kandahar and Marv.

Astar Abad State was in the northwest of Khorasan and at the side of Caspian Sea with Turkman Tribes being part of its residents. The most important of these tribes were firstly Koklan and Yamut and then Ashaqeh Bash and Yukhari Bash. On the west of Astar Abad, the coastal Mazandaran and Gilan states were positioned with Rasht and Lahijan being their cities and the latter being the major center of silk production.

Of course, the "Arabs' Iraq" State with the centrality of Baghdad in the west and Kandahar in the east were repeatedly exchanged between Iran and Ottomans and also between Iran and India with the former being more under the domination of Ottomans and the latter being more in control of Iran.

### **Mirab [Water Supervisor]**

Being commissioned to the irrigation affairs, Mirab was considered as one of the important and, in the meanwhile, local governmental ranks. Mirabi rank has been more important and greater in the capital, i.e. "Isfahan's Dar Al-Saltaneh". For example, Ali Beyk who was Isfahan's Mirab during the governance of Shah Abbas I simultaneously held the army commander position of Khorasan, as well<sup>1</sup>. Isfahan's Mirab closely cooperated with Isfahan's minister and sheriff. However, the appointment of Mirab in the other states was

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<sup>1</sup> Bastani Parizi, "politics and economy of Safavid Era", p.67: following the complaints by the people, Ali Beyk was discarded from the army commander position of Khorasan and he was also deposed from Mirabi Rank because of behaving improperly.

different depending on the water conditions of every locality. For instance, in the large cities that were at the side of rivers, the central government appointed the Mirab but, in smaller cities, such an appointment was conducted either by the government or by the landlords<sup>2</sup>. In some regions, as well, farmers shouldered the water distribution management. Mirab position was considered as an important job in many spots like Isfahan, Shiraz, Marv and others and it has been more hereditary in such a way that Haji Muhammad Ali Nami who had inherited this rank from his father and having reached the Mostawfi [treasurer] rank during the late Safavid Era, had his sons still appointed as Mirabs till the end of Zandiyeh Era (Lambton, 2014).

The same way that the Mirab rank was a lofty position, it also had a lot of benefits, as well. In line with this, various figures have been mentioned in different sources as the revenues for the Mirabs. According to "Safavids' scroll" that was pertinent to the quality of distributing and regulating water in Zayandehrud, Mirab and his servants received six hundred and thirty tomans and two Qirans and twelve Shahis as their salary<sup>3</sup>. Based on Sharden's estimation, Minorsky has mentioned that Mirabs received over fourteen thousand Tomans annually as their salary; he also added that this sum has been in addition to the money collected by Mirabs' subordinates.

### **The Most Important Water Resources in Safavid Iran's Geography**

Iran plain and the adjacent regions that constituted Safavid Empire had different conditions in terms of the water resources' quality and quantity and their way of exploitation. One of the most important sources used herein for investigating the issue is the geographical book "Nozhat Al-Qolub" by Hamdollah Mostawfi Qazvini, who has carefully dealt with Iran's geographical issues. The eighth century was the period at which Iran gradually left behind the devastations caused by Mongols' raid and the agricultural and irrigational situations became better. Thus, the geographical data in Nozhat Al-Qolub can be used as a basis for the studies on this subject during Safavid Era because the natural geographical phenomena could not have undergone so much of a change in nature during this span of time. The most important water resources in Safavid Era's Iran can be divided into several geographical regions:

#### **A) Azerbaijan and Regions in Northern Iran**

As the first capital city of Safavids, Tabriz has been the focal point of a great many of the rulers' attention since long ago. This city's reconstruction and expansion was commenced especially after the Mongols' period. In this city and its villages, there were many gardens and farmlands that, as put by Mostawfi Qazvini, were irrigated by the waters from Sardorud and Mehranrud Rivers as well as by nine hundred and several aqueducts that had been dug by the rich in the past. However, these waters were not adequate for irrigating all the farms and waters since wells were incumbently utilized for doing so (Mostawfi, 1983). Mehranrud that supplied irrigation water to the suburbs of Tabriz and Sardorud and provided the southern and western regions with water, were both stemmed from Sahand Mountains. These two rivers joined in the north of Tabriz to form Rudsarav or the very "confluence" that was also known as "Sorkhab" and eventually poured into Urmia Lake (Le Strange, 1988).

After Tabriz, the city of Maraqeh was also supplied with water from a river called "Safi". This river, as well, stemmed from Sahand Mountains and, after passing through Maraqeh, irrigated many of the farms and gardens. One of the other important and holy cities in Azerbaijan State during Safavid Era was the city of Ardabil as the burial place of Safavids' ancestors. The city was provided with water from Andarbab River that originated from Sabalan Mountains. Mostawfi Qazvini stated that "since the river passed through Ardabil, it is also called 'Abardabil'; it subsequently joins the water of Ahar and pours into Aras". He has mentioned a length of about 150km for the river (Mostawfi, 1983). The northern section of Azerbaijan and "Aran" State was irrigated by the two rivers of Aras and Kor with the former being called "Araxus" and the second being called "Cyrus" by the Greek (Le Strange, 1988). Aras originated from Qaliqa and Arzan Al-Rum mountains. After passing through Armenistan and

<sup>2</sup> Mirza Rafi'a, "Dastur Al-Moluk", p.427 (explanations section)

<sup>3</sup> Minorsky, "administrative organization of Safavid Government", p.155

Azerbaijan's states and irrigating many farmlands in these regions, they joined the water in Kor and Qarasu Rivers and poured into Caspian Sea in the vicinity of Gashtasfi (Mostawfi, 1983). However, there were many water resources and rivers in the northern states (in the periphery of Caspian Sea) with a lot of rainfalls; amongst these and as found out in the geographical resources, three rivers played a prominent role in the prosperity and irrigation of the near farmlands:

- 1) Sefidrud that was composed of two primary tributaries: One being Taleqan's main stream that, as opined by Mostawfi Qazvini, was per se comprised of two branches, one of which flew from Qazvin's Taleqan Mountains and the other one flew from Nasrotakhmas" which is unknown to us. According to Mostawfi Qazvini, the water of Sefidrud was not used so frequently and part of it was employed for irrigating the farms on Gilan Plateau and the rest poured into the sea (Mostawfi, 1983).
- 2) Tifuri River which is the very Gorgan River that Mostawfi called it "Jorjan Water" in eighth century stating that it sources from Asnad Mountains in Mazandaran and that most of it is idly left to pour in Caspian Sea after irrigating the farmlands. The river is 900km in length (Mostawfi, 1983; Le Strange, 1988).
- 3) Atrak stemmed from Khorasan's mountains and poured into Caspian Sea. This river also is used to irrigate many farmlands and orchards on its route. The river is mentioned to have been 748km in length (Mostawfi, 1983).

#### **B) The Most Important Water Resources in Khorasan and Sistan**

In Khorasan's regions, two important rivers that have had a considerable role in the prosperity and agricultural booming of their basin can be pointed out. These two rivers were:

- 1) Marqab or Marvrud that originated from Qur Mountains in the eastern north of Herat and, after passing through the lesser and the greater Marvs, was divided into a large number of ditches and the rest of it sank in the sandy lands of Qaz Desert (Le Strange, 1988).
- 2) Herat River or Harirud also originated from Qur Mountains and was used for irrigating the farmlands in Herat Valley through separating several ditches from it. Mostawfi Qazvini has named nine streams of water that had been separated from it for the irrigation of the regions in the periphery of Herat. The additional water of this river sank into the northern deserts of Sarakhs (Le Strange, 1988).

But, the largest river used for supplying water to Sistan State was the very well-known river of Hilmand or Hirmand. It was also called Abzareh for it eventually poured into Zareh Lake. This large river originated from the mountains in Ghazni and Bamyan that are currently situated in Afghanistan's territory. Five large streams were separated from Hilmand, namely 1) Ta'am or Kharobar ditch that was used for supplying water to the lands outside Zaranj gates; 2) Bashtrud ditch; 3) Sanarud ditch that went to the center of the state; 4) Sho'beh ditch that irrigated the lands of about thirty villages; and 5) Mileh Ditch. Of course, there was also a smaller ditch that had been separated before the river's arrival at the sea and it was known as Kerak Ditch (Le Strange, 1988). In the state of Sistan as in the other states, as well, small rivers have also been flowing like Rudfereh, Rudkhash and others.

#### **C) Water Sources and Irrigation in Non-Arabs' Iraq**

In their geographical divisions, Nozhat Al-Qolub as well as the other sources from Safavid Era have repeatedly mentioned the name "non-Arabs' Iraq" and "Arabs' Iraq". Such a classification is said to have become mistakenly made since Seleucids Era does not clarify exact delimitations (Le Strange, 1988). However, Mostawfi Qazvini has used the term "non-Arabs' Iraq" in 8<sup>th</sup> century for the regions in a stretch from Ray to Zanjan's limits, Isfahan, Hamadan (except Kermanshah) and the same classification has also been utilized in the present study:

##### **1) Ray, Qazvin and Zanjan**

The very vast plateau encompassed an area from Ray to Qazvin as well as the periphery of Zanjan constituted an important part of the non-Arabs' Iraq. The surface water resources of this region

were abundant because a number of its rivers and springs were seasonal. Thus, a large number of aqueducts had been constructed for compensating the water shortage in this region but the quality and quantity of the most important rivers of this region were as explicated beneath:

- 1) Jajrud that originated from Damavand Mountains and flew into the state of Ray. It has been mentioned that about forty ditches were separated from it and their waters were exploited for the irrigation of the majority of the farmlands in this state. In spring, their extra water was poured into the deserts and reportedly the river has been 187km in length (Mostawfi, 1983).
- 2) Kuhrud (Gohar Rud) that originated from Taleqan and Qazvin Mountains and several ditches were separated from it in Savajbolaq Region. There were regions in Shahriyar and Ray states cultivated and irrigated with these waters. In spring, the additional water sank in the deserts and its length has been mentioned to have been 156km (Mostawfi, 1983).
- 3) The other rivers of this part of non-Arabs' Iraq were Karaj river (near Tehran), Kordan Rud, Kharqan Rud and others (Mostawfi, 1983).

But, as the second capital of Safavids and a part of the non-Arabs' Iraq, Qazvin had many gardens and farms so it has been in need of a vast irrigation network for the surface waters since the rivers and springs were not sufficient for irrigating them. In addition, there was not a river with plenty of water in Qazvin and its peripheral regions and the water of the existent rivers was mostly supplied by the snow and a few springs. Due to the same reason, these rivers had water from late winter to early spring but they became dry during the hot seasons (Mostawfi Qazvini, 1985). Thus, several aqueducts have been excavated to supply the city and the farmlands with their needed water.

## 2) **Saveh, Qom and Isfahan:**

These regions formed another part of the non-Arabs' Iraq. Besides the small rivers and aqueducts, a vast part of the farmlands were irrigated in Saveh by the water from Mazdaqan Rud or Rud Saveh that was also known as Gawmaha or Gawmasa originating from Alvand Mountains in Hamadan and joining somewhere on its route to Qomrud. It was with the construction of a dam in the vicinity of Saveh on this river that the states of Saveh and Aveh were irrigated. Mostawfi Qazvini mentioned 249km for the length of river in Saveh and stated that its spring sewage sank in the desert (Mostawfi, 1983; Le Strange, 1988). He also added that the other notable river of this region is Qomrud or the river of Qom that stems from the mountains in the state of Jarbadeqan (Golpayegan) and, after irrigating the farmlands in Jarbadeqan and Qom, its surplus water is discharged into the desert. The length of this river has also been mentioned to have been 187 kilometers (Mostawfi, 1983).

In general, the most frequent regulations reflected in the Safavid Era's sources about the quality of exploiting the water resources pertain to the irrigation rules in the watershed of Zayandehrud River. The thing that caused the standardization of this river's exploitation conditions was that Isfahan, as the third and the most important capital of Safavids, and the lands in its periphery had to be irrigated by this river. The author of Nozhat Al-Qolub had the following words about the appellation of this river: "This river has such a property that if a dam is constructed in a position on it, its source would still produce so much water forming a large river and this is why it is called Zayandeh Rud (generative river) and it is also called Zarrinrud [golden river] for the reason that nothing of its water is left idle and the whole water is applied" (Mostawfi, 1983). He mentioned 436km as the length of Zayandeh Rud and some others have also written 530km as its length with 105 Maddi (main ditch) separated from both of its sides. As for the appellation of the Zayandeh rud's tributaries, Campfer wrote that the first (main) tributary is called "Maddi" no matter how long it is. The branch separated from Maddi is called "Jadval" [stream] and the narrow channel separated for irrigating the farmlands and supplying the people's houses with water is called "Jouy" [ditch]<sup>4</sup>.

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<sup>4</sup> Campfer, Ibid, p.188

### 3) Southern Regions of Iran

But, the most important rivers that irrigated the other southern regions in Iran are the followings:

- 1) Dejl: Khuzestan State was actually irrigated more by Karun and its tributaries. Arabs had given the name Dejl, meaning the small Tigris to Karun so that it might not be taken for the real Tigris by mistake. Since this river passed through Ahwaz, it was also termed "Ahwaz's Dejl" (Le Strange, 1988)<sup>5</sup>.
- 2) Karkheh: It was called Nahr Al-Sus by Arabs and it irrigated a vast part of the lands in Khuzestan. This river flew from Alvand Mountain in Hamadan and joined the waters of Dinvar and Silakhor and Khormabad and Kajaki and passed altogether through Howaizeh. After joining the waters of Dezful and Tostar (Shushtar), this river poured into Arvandrud (Shat Al-Arab) and its length has reportedly been 748km (Le Strange, 1988).
- 3) Kor: It was one of the most important rivers in the state of Fars with its origin being Karvan Region in the south of Ojan. After irrigating the regions of the higher and the lower Karbals and the other regions and farmlands, Kor River eventually poured into Bakhtegan Lake. Mostawfi Qazvini has written 705km as the length of this river (Le Strange, 1988; Mostawfi, 1983).
- 4) Sakan Rud: It is also called Zakan by Mostawfi Qazvini who stated that it has been the most useful river in Fars with a length of 312km and eventually pours into the sea of Pars in Siraf region (Mostawfi, 1983). The other rivers of Fars State were Ratin, Ahanin, Jarshiq, Tab (Jarrahi), Shirin, Rudshapour and so forth (Mostawfi, 1983; Le Strange, 1988).
- 5) Halilrud and Divrud that have been flowing in Kerman State; Divrud was enumerated amongst the important rivers of the state that originated from the periphery of Jiroft. It has been stated that it has been flowing on a sharp and steep bed and this is why it was called so (Mostawfi, 1983).

### D) Arabs' Iraq

In Arabs' Iraq region, there have been two rivers called Tigris and Euphrates that played a significant role since long ago in the expansion of the region's agriculture and prosperity. Since the time they gained access to this region, Safavids used these water resources for improving the region's agriculture.

- 1) Euphrates (Mostawfi, 1983) <sup>6</sup>: As it was mentioned, extensive irrigation networks had been formed in Mesopotamia since the past times. In Safavid era, as well, and due to the feeling of sincerity for the holy shrines, kings of this dynasty used to pay a great deal of attention to Iraq. Therefore, they seized any opportunity for the prosperity and development of this region. It was Shah Ismail I (1528-1551) who, for the first time in 1535 and after the conquering of Arabs' Iraq, commanded the reestablishment of the ditch that had been stretched by Ata Malek Esfarayeni from Euphrates to Najaf but destroyed during the Mongols Era. This important task was assigned to Qazi Jahan Qazvini who made a lot of efforts and spent a sum of money over ten thousand tomans to revitalize the ditch which became afterwards known as the holy ditch. It is stated that the ditch has been the source of income up to two to three thousand tomans annually for the holy shrines of the immaculate Imams (peace be upon them)<sup>7</sup>. Then, Shah Abbas I (1617-1659) who had gone to Arabs' Iraq in 1653 ordered after paying a visit to the honorable holy shrines of Kazemain and Najaf, the dredging of the river that had been stretched or reestablished by the command of Shah Ismail I from Euphrates to Najaf. He also commanded the digging of an aqueduct from Kufa for carrying water towards the lake (pond) in Najaf thereby to provide the residents inside and in the periphery of Najaf who used the bitter and salty water of the wells with fresh water (Turkman, 2003).

<sup>5</sup> according to Le Strange, the term "Karun" has been taken from Kuhrang Terminology.

<sup>6</sup> Mostawfi Qazvini writes that Euphrates was called so for the pleasantness of its water because Arabs call Euphrates every water that is lucid, sweet and pleasant

<sup>7</sup> Buraq Qazvini, "Jawaher Al-Akhbar", p.27

- 2) **Tigris:** The second large river that was used for irrigating many of the regions and lands in Arabs' Iraq was Tigris that had been stretched in a long length along Euphrates. Due to the same reason, the vast region situated between these two rivers was called Mesopotamia. Mostowfi Qazvini stated that the water of Tigris stems from Amad and Selseleh Mountains and the waters from many springs pour into them. After passing through Rum and Arman states, this river is added in its volume with the waters of Arman in the beginning of the Arabs' Iraq territory and also with the waters of Nahravan somewhere down Baghdad. However, in the lower middle part, five important ditches have been separated from it, namely 1) Tigris Ditch; 2) A'araf ditch; 3) Ja'afar ditch; 4) Maisan Ditch; and, 5) Sasi Ditch (Mostawfi, 1983). Tigris joins Euphrates and the waters of Khuzestan further down the village of Matareh and forms Arvandrud (Shat Al-Arab). He has written 1872km as the length for Tigris (Mostawfi, 1983).

## Conclusion

This study dealt with one of the important and, in the meantime, less attended issues of the history, i.e. water system in Safavid Era. After presenting an overview of Safavid Era Iran's historical geography and its geographical divisions, irrigation forms were explored.

Safavid Dynasty that ruled Iran for about 221 years during the years from 1501 to 1735 inherited a country that had undergone intensive declines in its economic power due to the numerous domestic problems and distresses and foreign battels and invasions; the farmlands had been destroyed and the streams of water and aqueducts had been completely diminished and thousands of the society's generative and active forces had been completely eradicated as a result of the domestic wards. Resultantly, the market stagnation, roads' insecurity and absence of order had caused the domestic and foreign business to be in its minimum possible extent.

During the antecedent Safavid Era, especially during the governance of Shah Ismail I, not much of a change is seen in the irrigation system. During the governance of Shah Tahmasb I, as well, reformations in the various agricultural and irrigational grounds (as a sub-branch thereof) have been reported with its Tajik functionaries having practically had no power to counteract the authority of Turk Qizilbash Amirs.

Since Shah Abbas I's period, the first transformations were commenced in the irrigation system and efforts were made for improving and changing it and they were even continued till the preliminary era of Pahlavi Dynasty in such a way that Sharden called unprecedented the aqueducts excavated in this period.

Zayandehrud had vital importance to the capital of Safavids and followed a standard system that was kept ongoing for long years. Of course, many interventions were also carried out by Safavids in the other lands of their empire as outlined above.

It can be summarily stated that such reformations and interventions caused the relative improvement of the agricultural status and increase in its agricultural productions and brought about sustainable evolution in the irrigation system.

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