

Approaches to Water Utilization in the "Sahara Kousour" Region of Southern Algeria: A Study of Methods and Practices.

D/ Gaouba youcef (*) University of Adrar (Algeria) Laboratory Of Algerian Manuscripts in Africa Gaouba.yaoucef@univ- adrar.edu.dz	D/ Boussaid Ahmed University of Adrar (Algeria) Laboratory Of Algerian Manuscripts in Africa Ahm.boussaid@univ-adrar.edu.dz
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Abstrac:	This study explores the traditional methods and practices of water utilization in the "Desert Kousour" region of southern Algeria, focusing on the systems developed by local inhabitants to manage scarce water resources in a challenging desert environment. Through a detailed examination of these water systems, we aim to provide readers with a deeper understanding of their functionality and operation.
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* Corresponding author

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The research:

Covers the following issues:

Introduction:

Water is the secret of existence and the source of life, and the mainstay of civilizations, it is the first factor behind every human activity, which makes it extremely important in human life because it is one of the most important component elements of life, which explains to us why previous civilizations were next to water sources such as valleys and Wells, and perhaps the desert man is no different from his predecessors, he also needs water in his daily life, as this prompted him to develop a set of systems that exploit water and make it available to him in order to exploit it in his daily life.

The inhabitants of the "Kousour" region endeavored to innovate techniques and methods to harness groundwater by digging wells and developing various systems. Among these is a system known as "FOGGARA", which functions to extract groundwater to the surface and channel it to the palaces and palm groves for utilization. Additionally, another system called "NA'OURA" was also successfully employed to meet the water needs of the population. These systems served as a true lifeline for the inhabitants, protecting them from drought and the harsh natural conditions characteristic of this region.

By either of the above mentioned we can pose the following problem:

How did the inhabitants of the “Sahara Kousour” manage to create these systems?

To what extent have these systems contributed to the stability of the SAHARA individual?

1. GENERAL CONCEPTS:

KOUSOUR:

In the Arab language the name Kasr is the house, and so called because inside it the haram (the family)¹ is divided according to the coranic verset: {Fair ones reserved in pavilions}², and the plural of Kasr is Kousour as indicated in the Quranic verse: { And remember when He made you successors after the 'Aad and settled you in the land, [and] you take for yourselves palaces from its plains and carve from the mountains, homes. Then remember the favors of Allah and do not commit abuse on the earth, spreading corruption}³, and in the coranic verset: {Blessed is He who, if He willed, could have made for you [something] better than that - gardens beneath which rivers flow - and could make for you palaces}⁴.

As for the concept of the KASR in the desert areas “EL KSAR” in the silence “L” letter, as it is circulating in the desert areas, it is a fortified village or rather A cohesive

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residential blocs inhabited by human groups belonging to different ethnic origins or social classes, consisting of a group of unified houses of one color and one shape, which are surrounded by a high wall, The name of the KASR is often attributed to the name of a virtuous person who had a religious status and a good fate in the middle of his tribe, and he had a great favor in reuniting and educating them, and the kasr may also acquire a designation which is a subject to the geographical factor, so that it is called according to the location where the kasr is located, as we find some kousour known as the "El Kasr El Kabli" and "El Kasr Edhahrani", and the naming of the kasr is also subject to many factors no less important than the ones we mentioned, as we find some kousour called the the name of the "El Kasr El Faugani" or "El Kasr Ettahtani" according to their location, the naming is also attributed to the size of the kasr (big, small), so it is called "EL Kasr El Kebir" (the big kasr), and "El Kasr Essghir" the (small kasr) and it is also attributed according to the age of the kasr or its modernity, It is called the "new kasr" and the "Old kasr"⁵.

The kasr can include a group of kousour inside it, such as the Kasr located in the "Bouda" area of Adrar, which includes fifteen Kousour, and the Kousour, in addition to the houses te Kousour contain various facilities, the most important of which is the mosque, which occupies a central location for the kasr, in addition to the market, shops and

public squares, and some Kousour contain a fortified Kasbah that is the seat of the governor.

One of the main features of Sahara Kousour is that they are located on top of mountain peaks or slopes, or on hard rocky plateaus that facilitate the process of defending themselves, and enable them to exploit the water element and distribute it in a way that allows all Kasr residents to obtain water in a controlled and regulated manner, and also characterized by their close connection with the agricultural field ,they are located near the agricultural earth ,so we observe that the Sahara Kousour are surrounded by the palm gloves which considered as the economic pillar to their inhabitants while these glove give an appropriate climate helping the inhabitants overcome the difficult desert climate as well as the sand whirlwinds that the desert witnesses greatly during the summer⁶.

2. Water Resources of the Sahara:

The Algerian desert is among the places that have had a set of important human gatherings since time immemorial, these gatherings were based on a set of water sources, including valleys (The valleys in the Algerian desert, although they are dry on the surface, usually flow under sand and gravel, and therefore their water is protected against active evaporation of the surface, these valleys continue to flow underground, thus forming an important source of water In the region)⁷, “Sabkhas” and Wells, These communities have exploited the water available at the level of these

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sources, it was like life for them, they worked on the construction of their “Kousour” and their beautiful oases, which guarantees them the continuation of life in such areas where it is difficult to live, and we can say that these sources had a great role in determining the places of residence of these human gatherings, where we note that human gatherings since time immemorial have been following the sources of water to reside near and on the outskirts as it represents one of the basics of life, so these sources greatly controlled the place of residence and even the types of agricultural activities practiced in such areas.

Desert regions shared a set of characteristics, the first of which are: Water scarcity, as the desert areas suffer from a severe shortage of surface water sources with easy use, with the exception of sources located in the south-west, precisely in the Bani Abbas and Saoura, which benefit from surface sources and have made them green oases in the middle of a dry and harsh desert, but in the eastern region of the Algerian desert, it is of a special case, as this area has a layer of water located in a not far location under the sand, which makes it easy to use, and other various desert areas known the extraction of the water through the artesian wells and they need a great human effort , because the water layer is located in a quite deep under the surface of the Earth.⁸

Residents exploit surface water despite its scarcity, and in case of drought, they resort to exploiting the water bed left by the leakage of water from rivers by drilling wells.

3. The Water System in The Kousour:

Element of water is a very important element in various parts of the Earth and it cannot be dispensed with, and the importance of this element is increasing in desert areas as a result of harsh conditions imposed by nature and the desert climate, and a close relationship has developed between the “desert kasr” and water, and therefore we note that most of the “desert kousour” are created near the rivers among these Algerian sahara rivers we can note : "Wad Zab", "Wad Suf", “wad Rig”, “Wad Miya”, “Wadi Mzab”, “Wad Al-Saoura”, and “wad Ighargarr”, where a group of population settlements are gattered around these valleys, which after their development became Kousour, some of which remained tall to this day, and some of which became extinct due to the drying up of wells and valleys⁹.

A "TAJMAAT" authority in both TUAT and wad rig districts has been keep to carry out the water distribution process and resolve various disputes that arise around this important element, The Kousour contained a set of wells inside them, which were built inside the Kasr for several reasons, foremost of which is the fear of sudden Wars, so that the Kasr becomes a fortified castle and contains the most important requirements of life inside it, as we find that in the wad Rig area, the desert Kousour have included several water wells, where each Kasr contained one or two wells, according to the population census inside the Kasr, in order to exploit this water during peace and war by the residents of the Kasr, and the wad Rig area was not the only one that worked on

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drilling wells inside the Kousour, but we also find this phenomenon in the wad Rig area, where its Kousour included many wells, such as the "kasr Metlili" and the "Kaser Kenadesa", and "Kasr El-Attef" which are still their tracks are a witness to today¹⁰.

As for the Kousour of the south-west, they were associated with one of the wonderful systems that were the Savior in these difficult desert areas, the inhabitants of these Kousour excelled in the latest system known as the "Foggara" system, this system that symbolizes life in this desert area, thanks to which man and animals lived, agriculture was active and orchards were established, it represents the lifeblood of the inhabitants of the TOUAT region, whose life is based on this system, and as a result of the importance of this system, the inhabitants of the region have given it due attention, as this system was based on a set of laws and foundations and is subject to several conditions that make it continue to provide Kasr residents with water .in the coming pages, we will try to study this system more broadly, highlighting its importance In the life of the population and the various laws and conditions on which it is based.

The process of drilling wells in desert Kousour is subject to several conditions, the foremost of which are:

- The meeting of the group of “Kasr” notables and the owners of the orchards with the “sheikh of the Kasr” to determine the location of the excavation.

- Agree on the various basics associated with this process such as the costs of drilling and the duration of the drill, and work to divide these costs among the residents of the Kasr who want to benefit from the water

These amounts are also subject to conditions and restrictions, the first of which is:

The number of palm trees per owner, and sometimes one of the residents of the Kasr alone is responsible for drilling operations by covering the costs of drilling and considering it an ongoing charity, and this well takes its name as an honor to him for the work he has done, and after the completion of these operations, the shares are recorded for each owner in a notarized contract in the presence of the kasr judge and this contract contains the smallest details¹¹.

4. Drilling Wells in Kousour:

The method of creating the Foggara is a difficult and laborious method that requires great effort and patience, the historian “Ibn Khaldun” says about it: "in this desert country, beyond the race, there is a strange way of extracting running water that does not exist in the hills of Maghreb, and that because the well is dug deeply, far ventilated and folds its sides until the drill reaches hard stones which excavated by

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pickax and axe and this strange method is found in the Kousour of Touat, Tikurarin, Ouargla and Rig".¹²

The first steps in the process of creating a foggara are to carry out inspections of the places where water is present. this process is carried out by specialists and people familiar with this profession, as this science allows providing important information related to water and its details and finding out how close or far from the surface and its low location to obtain an "Amazer" degree¹³.

During this drilling process, three categories are used, namely: "well drillers" who carry out the drilling process, the second category is the category of "carpenters" who build and install the casing of the well to its full depth, and finally come the "divers" (Rattasoun), whose work consists in piercing the hard layer separating them from the water, They carry out the process of cleaning the well from dust to make way for water to rise, the first category digs at great depths to reach the aquifer, the depth of which varies depending on the area to be drilled, one of the "digger" digs until reaching the clay layer¹⁴, while the workers of the second category "carpenters" build the walls of the well with bricks and support the well, where the well holds the palm trunks up to the water layer, so the structure of the well is formed by palm trunks superimposed in the form of a square with dimensions between 70 and 75 cm, from each ,this frame is fixed with clay by installing holes on the right and left of the well, Then they are connected to two trunks about three meters below

the well, and they are connected by a horizontal beam of solid wood at a height of 1.50 m, and then a rope is attached it in order to lift the dust from the well, so that the diameter of the well does not exceed 80 cm, and by reaching the underground layer the process becomes more difficult than before, at this advanced stage of work there is a need to the (Rattasoun) divers, who they start the dig inside the aquifer to extract the dusk through a basket and ax. By the difficulty of this mission the divers heritate it from a very young age in order to get used to staying in the water for a long time, sometimes up to four minutes underwater¹⁵.

The “diving” process is based on a set of rules and laws that make the task somewhat easy for those who are used to it, as a fire is lit next to the drilling site to warm their bodies after each descent into the well, and before the "divers" descend into the well, they take a set of safety measures, foremost of which is:

- Close their ears and nostril with goat "grease" so that they do not suffocate.

- The second procedure is to massage their bodies so as not to get muscle spasm while diving into the water.

- The third procedure is to tie the mselves with a rope tied around the waist, the tip of which starts from the top to be pulled when needed, and the basket is tied with another rope to be pulled after each removal of soil from the well.¹⁶

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Due to the difficulty of this task, the diver cannot perform this operation more than five times per day, due to its difficulty and the fatigue it causes, so on the last dive he dries himself near the fire to lower one of his comrades in his place, and the deeper the well, the more the number of "divers" to reach the solid layer that is the separation between them and the water, and the process here becomes more difficult than the previous stages, as the "diver" becomes exposed to the explosion of this layer directly after he hits it with the ax, where the "diver" gives the signal to pull it out immediately before water suffocates him, and any mistake or delay leads the diver to certain death as a result of the high flow of water from this layer.¹⁷

The "Carpenters" carefully follow the operations carried out by the team of divers to protect them from any danger arising from landslides by making molds and preparing them for placement successively during drilling operations to ensure the protection of the category of divers from the collapse of the sides of the well on them while performing dust removal work.

This technique has aroused the admiration of many travelers and writers, including the traveler "Ayashi", who admired this method and described it by saying: "one of the oddities of this town is the extraction of abundant water sources by drilling wells, so they dig about Fifty Fathoms and then reach a polished stone on the face of the Earth and click on it, if they pierce it, the water overflowed from it with a

strong flood and quickly looks to the mouth of the well and becomes an eye, if the hoof is not corrected it by rowing, the water drowned it."¹⁸

This craft has remained a witness to the development of the desert individual until the twentieth century, where the French and explorers paid attention to this craft, which they wrote about at length, where we find Mr. "Colonel Theodore-Payne", who wrote about her by saying:" I can't describe wad rig to you without talking about the technique of drilling artesian wells in it, I feel the inability of the language to describe what my eyes saw in such cases, especially the description of people who do the "diving" operation in the depths of wells(meaning divers), in which there is a big risk, and this profession is considered one of the most important professions in wad rig, because of the importance of water in such a desert area, whose inhabitants greatly need water to ensure to survive, the Arabs brought water and revived the palm forests of this desert country by digging wells with primitive means and laborious operations... The diver is the main man and the axis of construction in this process, as for his appearance, there is nothing to seduce and nothing to tempt, he is muscular, thin, ugly, often sullen, to look dignified, a person who is fully aware that the wealth of the people who benefit from him will not be enough to reward him, and he who does not want to reward him, exploiting his superiority, a man who is not afraid to risk his life five times a day for a fifty-centimeter basket, does not have self-interest as his motivation, he is a

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person who dedicates himself to the happiness of others, doing by making peace to the audience and introducing himself and his companions before they undress. there are naked like the gladiators of ancient times, and bakers today, to light a big fire, to warm themselves Near her, the audience motivates them with loud voices and chants the saying (Come On, do it) "¹⁹.

As for the remuneration of such workers, it varies depending on each of the three categories involved in this work, where the "Carpenters" receive an amount of: 11 francs per vertical meter of formwork, while the "divers" receive on average an amount of 50 centimeters for each basket they fill with dirt, it is true that the basket (This basket is made of palm fronds) is small²⁰, but the discomfort they feel during work is very large, they work in a narrow and dark place, it is often flooded with water and does not allow them to fill enough to make a lot of profits, and due to the difficulty of their work, they men, have an important place in the Kousor society ,in addition to the amount above noted ,they obtain a set of palm gloves and small houses, these latters will be the benefit of their sons because this craft is tired for these men. where the process of the dig causes the holding of their breath under water for several minutes leading to diseases at the chest level that make them live days Shorter than others.²¹

5. Methods Of Water Exploitation in Kousour:

5-1. The Method Of "Na'oura":

The use of water in desert Kousour was among the things that were given great importance, and the inhabitants of the desert excelled in inventing many ways to exploit water, and among them was the method of Na'owair (waterwheels) , which is a traditional device consisting of a roller that varies from one region to another, sometimes we find a wooden roller, and other times it is iron, managed by one of the animals such as a donkey or camel, which works in a circular way that makes this water fountain lift water from the bottom of the well to the surface of the Earth, and this water is placed in a large basin built near the well, It branches off from a group of main Sawagui (Saguia) ranging in width from 1 meter to 50 cm, and its depth is between 5 cm and 10 cm, and these main Sawagui also branch into “sawagui ferayia” (small) within palm groves, which are between 10 and 30 cm wide, but their depth is no different from the main Sawagui, to form an organized water network that preserves the life of palm groves and ensures a permanent and organized water supply, and due to the importance that the residents of Kousour are involved to the substance of water in this process, where he works on making a traditional machine known in the Kousour of the “wad Rig” as “EL Masref”, As for the kousour of the south-west, it is known as the “Shakfa”, which is a metal or wooden plate that is rectangular, and in some areas it is circular, such as the “Tidikelt” area, which is of varying dimensions fixed with clay and stones, which opens and closes according to the

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direction to be irrigated and the period allocated to it using traditional materials such as swab and clay.²²

* Water Distribution:

The process of distributing water to the residents of Kousour is among the processes that arouse a lot of controversy and disputes among the residents, although this process takes place at the level of the meeting held by the "Sheikh EL Kasr" in the presence of Kasr notables and participants in the well drilling process, whether with effort or money, and water is divided among them according to several considerations, so as the big part is reserved to whose pay more or works more: The "Naouba" was considered as a unit of measurement to distributing the water .and it is divided to smallest units which are $\frac{1}{2}$ "Naouba , $\frac{1}{4}$ "Naouba, $\frac{1}{8}$ "Naouba and it is determined by a total of 24 hours divided by the residents of the kasr, knowing that the well water in the area is divided into twenty-eight Naouba, and sometimes it amounts to fifty-six "Naouba" if the number of owners is many, so the duration of the cycle in the first case is fourteen days, but in the second case it becomes twenty-eight days.

Due to the importance of the water distribution process, it was mandatory for each of the "kousour" to assign one of the residents to this task, which is called the "Kiyal al ma" (Water agent) "The agent" Kiyal is the person who performs the "alkali" process, i.e. calculation, and this is done by bringing what is known as "Shakfa" and he must highly

experienced and a source of trust for everyone, but the second person in this process is the “Makil lah”: he is the person concerned with the “Alkail” process, and he must be present to confirm for himself his share and the amount of Water directed (gived) to him.²³

5.2 Foggara Method:

Its definition:

Foggara is a word pronounced by the local tongue to denote the watering system “EL Foggara” and its combination “Faggagir”, thus it becomes clear to us that the word "EL Foggara" is an authentic Arabic word that has turned over time to the colloquial pronunciation, and this word has become indicative in its content of a narrow tunnel and The Shape of a hole in the ground connecting a series of wells and this hole collects water from sources located at different levels with a simple slope, the purpose of which is to allow water to flow through the internal corridors where those wells are connected and water flows from the upper wells to the lower Wells The water flows from one well to another to end up in a receiving Basin where the water meets to finally distribute it to meet the human needs of watering, drinking, and other various uses.

*The Method Of Creating a Foggara:

At the beginning of the construction of the Foggara, the first stream that follows its garden is open to the air at a level suitable for irrigation directly, and it was called

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(Agoser), it is usually determined between the end of the Foggara wells and the Oasis kousour, and it is covered with stones to prevent sand crawling on it, and there are nozzles which are put and usually used for watering, and from the first well in "Agoser" or "Agisero" the depth begin to increase, so the Foggara stream begins to extend below the surface of the earth.²⁴

The Foggara includes several important parts, as follows:

* **Branch or (Craa):** the Foggara may reach the end of the height before obtaining the desired amount of water, and the drilling is poured in the straight direction, so the expert is forced to stop the extension and drill other wells on one side of the Foggara in order to connect with it and it is called the (Craa).

* **Agoser, or agisero:** when the Foggara water approaches the agricultural land or kousour, the Foggara turns into a (Seguia) on the surface of the Earth, called "Agoser".

* **Al-qasriya:** at the end of the mother "Saguia", Al-qasriya which is a rectangular corridor carved with protection, and in an accurate calculation method on a stone piece of flat "Tafza" that allows the distribution of water according to the required and specified rations for each owner.

* **Tapjot:** during drilling operations, workers are sometimes exposed to a solid stone, so they are forced to open a small

hole in the intercepting stone to run out of water, known as "Tapgoat".²⁵

* **Magen:** it is the basin in which the water of the Foggara meets in the orchard for watering, and it is also a unit of measurement in Touat that has an outlet called (Anfif).

* **Saguia:** it is the stream that the water passes through it to the entrance of the village to be used for daily purposes of distributing water to orchards, drinking and others.²⁶

* **Foggara water distribution:**

The process of distributing the Foggara water and dividing it to the owners is carried out with a measuring machine called (Chakfa) which is an open copper cylinder from the top and bottom, pierced in its sides according to different sizes, and this hole is 13 mm in diameter, at a height of 23 mm from the measurement level, and it is four liters per minute, but the shape of the slot varies from region to region, Where we find it in the Tidikelt in a cylindrical shape (Guillaume, 1903, p. 12), while in the central Touat it becomes in the form of a rectangle, and its name also changes from one region to another where it is known by several names: (Qild), or (Hallafa), or (Qasamah) and the unit of measurement is El Habba (the grain), and it is also known as (the Aoud) in "Bani Muluks", and sometimes it is called (the Majin), The (Chakfa) includes a set of holes, which are actually parts and multiples of the (Habba) It is called (ziraq) and it is:

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Half, third, quarter, sixth, half-sixth, quarter-sixth.²⁷

CONCLUSION:

Concluding the above - mentioned on the topic “Methods of water exploitation in the desert Kousour of southern Algeria”, We have come to a set of points and results, which we will try to summarize through the following elements:

- The Algerian desert represented one of the areas with high heat and severe drought, which made it a region with a very difficult nature and climate that cost the desert man great hardship and great trouble, making him always seek effective means and ways to obtain water, especially in such a region, which is witnessing a scarcity of surface water element.
- The desert Kousour represented true fortresses for the inhabitants, as they were fortified cities containing various daily necessities for the people. These "forts" included markets, mosques, and even wells, which have remained, to this day, one of the most important elements in the lives of humans in general and desert dwellers in particular.
- The desert man excelled in creating a set of systems that were behind the process of exploiting groundwater, among which we find the so-called “fountains” system, which was witnessed in the south-eastern regions, and those in charge of it were of great importance and position in the “Kouser” society.

- The “Foggara” also represented a strange system that still raises many questions about the way it was created and how the desert individual was able to discover this system, which was a real savior for the inhabitants of the desert and their oases, which rely heavily on this system, especially since such areas know surface water only rarely.
- - The desert ”kousour” and the public facilities they contain are truly a safe place in the middle of a difficult desert that can only be overcome by staying in such “kousour” and working to equip and maintain them whenever required.

At the end of this research paper, we recommend giving greater attention to these water systems, especially in the current time when the world is more in need of water than ever before, particularly in desert areas that have now become some of the most productive agricultural regions.

5. Bibliography List :

1. Books :

- In Arabic

***Alquran Alkarim** (surah Rahman- Aya 72/ surah Al-A'raf- Aya 74/ surah Al-Furqan- Aya 10).

1. Abn Manzur, Lisan Alearabi, Dar 'Iihya' Alturath Alarabii, Ta 01, j 11, 1984.
2. Abu Salem aleayashi, alrihlat aleayaashiat liblique alhijaziat almusamaa ma' almawadi, dar alkutub aleilmiati, bayrut, lubnan,

Approaches to Water Utilization in the "Sahara Kousour" Region of Southern Algeria: A Study of Methods and Practices.

3. Mohammed Bey bel-Alamm, ElRihla EL Alaliya Ila Mintakhati Touat Li Dhkrir Baadhi EL'aalami wa El Athari wa El-Makhtoutat wa El Aadati wa Ma Yerbitu Tout Mina Jihati, the first part, 2005.
4. Mabrok mkadam, Madkhal Mounugrafiun lilmujtamae El Touati, part I, Dar Houma, Algeria, 2008.
5. Eabd Alrahman Aibn Khaldun, diwan Aleibar Wa Almubtada Walkhabara, Mujalad 01, Dar Alkitaab Allubnani, Bayrut.
6. Ismail El Arabi, Essahara El Kubra wa Shawatieuha, National Book Foundation, Algeria, 1983.
7. Qababilat Mubaraki, Tatawur Mawadu W 'Asalib Albina' Fi Aleimarat Alsahrawiati, Bisakra, 2010.

In French:

1. GEORGES ROLLAND, Hydrographie ET Orographie Du Sahara Algérien, Société De Géographie , Paris, 1886.
2. M. Ville ,Exploration Géologique Du Béni Mzab, Du Sahara et De La Région des Steppes De La Province D'Alger, Paris, 1861.
3. M.Nesson ,Structure Agraire et évolution Social Dans Les Oasis de L'oued Righ, Travaux de L'institut de Recherches Sahariennes Travaux de L'institut de Recherches Sahariennes, Alger, 1965.
4. M. Jus, Les Forages Artésiens De La Province De Constantin (Algérie),(Résumé Des Travaux Exécutés De 1856 A 1878, Paris, 1878.
5. Pein (M.T.H), Lettres Familiales Sur l'Algérie, un petit Royaume Arabe, Paris, 1871.
6. Victor Almand, L'Oasis D'Ouargla, Besancon Imprimerie Dodivers, 1890.

2. Journal article : - In Arabic

1. Muhamad Khibizi, Al'abead Alaijtimaeiat Fi Eimran Alqusur Alsahrawiat Bialjazayir, Majalat Aleulum Alqanuniat Walaijtimaeiat Jamieat Aljulfati, Aleadad Althaalithi, Almujalad Althaamin, Sibtambar.
2. Yaminat Bin Saghir Hadari, Nizam Almiah Biquhur Janub Almaghrib Al'awsata, Majalat Rawafid Lilbuhuth Waldirasati, Jamieat Ghardayati, Aleadad Althaamina, Jawan.
3. Oum-ELkhier, makadem, Kiyyal al ma wa Tegman hirfatan kadimatan bikouser Touat tosaryan mn adjel el baka, Rufuf, Adrar, 2023.
4. Hamed Lamin Ibrahim, Ahamiyat Al-Faggara fi Alnashat Alziraei bi iqlim touat fi Elkharnayni (13h/19), Afak-ilmia review , Tamenghast, issue 11, june 2016, Algeria.
5. Zouini Zahra, Hotiya Mohamed, Nidhaum Essakie Eltaklidi Fi Ell Janub El Khrbi El -jazeiri Wa Inikasatihi El Thakafiati khilala Elkharnayni (20/19m), volume 7, N 4, 2022.
6. Sagni Mohamed, Awamil Eindithar al-Faggara bi qusur mintaqat Aien Saleh Tidikelt Elsharkia, The Maghreb Review of Manuscripts, vol06,N1.2018.

In French:

1. Jean Hess, L'extreme-sud Algérien et le Touat, Annales de Géographie, t.6, N26, 1897.
2. Renseignements sur les foggaras du Touat, LE Saharien Revue D'Action Touristique, Culturelle, Économiques ET Sportive, 1978.

Approaches to Water Utilization in the "Sahara Kousour" Region of Southern Algeria: A Study of Methods and Practices.

7. Citations(*):

- ¹ Abn Manzur, Lisan Alearabi, Dar 'Tihya' Alturath Alarabii, Ta 01, j 11, p55
- ² surah Rahman- Aya 72
- ³ surah Al-A'raf- Aya 74
- ⁴ surah Al-Furqan- Aya 10
- ⁵ Muhamad Khibizi, Al'abead Alaijtimaeiat Fi Eimran Alqusur Alsahrawiat Bialjazayir, Majalat Aleulum Alqanuniat Walaijtimaeiat Jamieat Aljulfati, Aleadad Althaalithi, Almujaalad Althaamin, Sibtambar, p 243
- ⁶ Qababilat Mubarak, Tatawur Mawadu W 'Asalib Albina' Fi Aleimarat Alsahrawiati, Mudhakiratan Muqadimatan Linayl Shahadat Almajistir Fi Eilm Aluathar, Jamieat Bisakra, p 16
- ⁷ GEORGES ROLLAND, Hydrographie ET Orographie Du Sahara Algérien, Société De Géographie , Paris, 1886, p 16
- ⁸ Ismail El Arabi, Essahara El Kubra wa Shawatieuha, National Book Foundation, Algeria, 1983.
- ⁹ Mohammed Bey bel-Alamm, ElRihla EL Alaliya Ila Mintakhati Touat Li Dhkrir Baadhi EL'aalami wa El Athari wa El-Makhtoutat wa El Aadati wa Ma Yerbitu Tout Mina Jihati, the first part, 2005, p 27
- ¹⁰ M. Ville ,Exploration Géologique Du Béni Mzab, Du Sahara et De La Région des Steppes De La Province D'Alger, Paris, 1861, p 13
- ¹¹ M.Nesson ,Structure Agraire et évolution Social Dans Les Oasis de L'oued Righ, Travaux de L'institut de Recherches Sahariennes Travaux de L'institut de Recherches Sahariennes, Alger, 1965, p 90
- ¹² Eabd Alrahman Aibn Khaldun, diwan Aleibar Wa Almubtada Walkhabara, Mualad 01, Dar Alkitaab Allubnani, Bayrut , p
- ¹³ Mabrok mkadam, Madkhal Mounugrafiun lilmujtamae El Touati, part I, Dar Houma, Algeria, 2008, p 143

(*)Insertion automatique :1-2-3-4-5...

- ¹⁴ M. Jus, Les Forages Artésiens De La Province De Constantin (Algérie),(Résumé Des Travaux Exécutés De 1856 A 1878, Paris, p 30
- ¹⁵ Pein (M.T.H), Lettres Familières Sur l'Algérie, un petit Royaume Arabe, Paris, 1871, p 40
- ¹⁶ Pein (M.T.H), p 41
- ¹⁷ Yaminat Bin Saghir Hadari, Nizam Almiaah Biquisur Janub Almaghrib Al'awsata, Majalat Rawafid Lilbuhuth Waldirasati, Jamieat Ghardayati, Aleadad Althaamina, Jawan, p
- ¹⁸ Abu Salem aleayashi, alrihlat aleayaashiat lilbiqae alhijaziat almusamaa ma' almawadi, dar al kutub aleilmiati, bayrut, lubnan, p 48
- ¹⁹ Pein (M.T.H), 1871, p 43
- ²⁰ Victor Almand, L'Oasis D'Ouargla, Besancon Imprimerie Dodivers, 1890, p 8
- ²¹ Pein (M.T.H), 1871, p 44
- ²² Yaminat Hadari, P 145
- ²³ Oum-ELkhier, makadem,Kiyyal al ma wa Tegman hirfatan kadimatan bikouser Touat tosaryan mn adjel el baka, Rufuf, Adrar, 2023, p 935
- ²⁴ Hamed Lamin Ibrahim, Ahamiyat Al-Faggara fi Alnashat Alziraei bi iqlim touat fi Elkharnayni (13h/19), Afak-ilmia review , Tamenghast, issue 11, june 2016, Algeria, p 11
- ²⁵ Hamed Lamin, p 12
- ²⁶ Zouini Zahra, Hotiya Mohamed, Nidhaum Essakie Eltaklidi Fi Ell Janub El Khrbi El -jazaeiri Wa Inikasatihi El Thakafiat khilala Elkharnayni (20/19m), volume 7, N 4, 2022, p 46
- ²⁷ Hamed Lamin, p 14