IEREK PRESS
Academic Research Community

http://www.press.ierek.com

ESSD

ISSN (Print: 2357-0849, online: 2357-0857)

Environmental Science and Sustainable Development

DOI: 10.21625/essd.v3iss1.279

Rebuilding Cultural Identity

Nubian Rehabilitation along the Shore of Lake Nasser

Mourad S. Amer[1]

[1] *PhD, Architect & CEO of IEREK for Research Enrichment and Knowledge Exchange*

Abstract

Ever since the completion of the High Dam in 1964, Nubians have lost their culture and heritage as a result of sacrificing their land to flooding. Eventually, they became dispersed all over Sudan and Egypt with some ending up in different parts of the world and struggling to return to the shores of Lake Nasser.

With short-lived success, Nubians managed to make a resurrection of Wade Half and re-locate in Sudanese towns. This paper aims to conserve the Nubian identity, which has been abandoned throughout the people's emigration process. This paper presents a proposal of Rehabilitation to the Nubians and their homeland along the shore of Lake Nasser.

This paper provides recommendations for methods to repairing the damage caused to the Nubian population following their relocation and construction of the Aswan dam. The main idea behind this proposal is to re- link the Nubians to a life they loved and violated in terms of their association with the Nile River. It is an attempt to restore their favorite urban spaces and architectural elements. Without a doubt, the proposal encompasses recommendations to producing new designs to the Nubian house conforming to their identity, cultural heritage and modern-day civilization as a way of rehabilitation.

© 2019 The Authors. Published by IEREK press. This is an open access article under the CC BY license (https://creativecommons.org/licenses/by/4.0/). Peer-review under responsibility of ESSD's International Scientific Committee of Reviewers.

Keywords

Rehabilitation; Cultural Heritage; Resilience

1. Introduction

Nubians are native people who live along the shore of the Nile River, from Aswan in southern Egypt extending to the south of Khartoum, Sudan. Before the construction of the high dam, Nubians had a unique heritage, spoke two languages and had a distinct social practices, a unique and private culture.

Historically, the importance of Nubia stems from its location and role of being Egypt's gate or road to Africa. In spite of a troublesome past, war times and slavery occurrences, Nubians have preserved one of the richest traditions and cultures. Such maintenance of their heritage and conservation of identity could be attributed as well to Nubian women. The role of women could be summarized providing consistency and stability; a permanent and durable force in society passing on tradition to the young.

1.1. History and Cultural Heritage

As for the history of Nubian architecture and urban development in this area, large cities and monumental architecture has been discovered. Temples, museums and antiquities narrated the Nubian civilization. These narrations told of the history of Nubian farmers as administrators at the court of pharaoh, priests and priestesses in Egyptian temples (EL-Hakim, 1993). Over time, it became apparent that Egypt and Nubia were inversely correlated in the sense that when one prospered, the other experienced its weakest periods and vice versa (Bruce, 1976). One of the mentioned weakest periods had led general Amr Ibn El-As to send a force of 20,000 men to Nubia, after which Dongola, the capital of the state of northern in Sudan, was penetrated and a truce negotiated between both parties.

This truce has helped facilitate trade between Nubia and lower Egypt, led to the settlement of individual Arab traders in northern Nubia and the vicinity of Aswan in Egypt, as well as their intermarriage through the years. As a result, a new formation of nomads named Ababda, relating to genealogy of Abe Abida Ben EL-Graah, was generated.

Moreover, Nubia had ignored the religion of Islam for as long as 600 years until it was introduced due to intermarriage, Muslim invaders and Arab traders who took Nubian women for wives. This narrative mentioned helped Islam to present itself in Nubia as well as helped Nubians in maintaining their own culture, language and traditions by virtue of Nubian women and their passing on of tradition to the following generations (Anne, 1995).

Narrations told of the history of Nubian farmers as administrators at the court of pharaoh, priests and priestesses in Egyptian temples (EL-Hakim, 1993). Over time, it became apparent that Egypt and Nubia were inversely correlated in the sense that when one prospered, the other experienced its weakest periods and vice versa (Bruce, 1976). One of the mentioned weakest periods had led general Amr Ibn El-As to send a force of 20,000 men to Nubia, after which Dongola, the capital of the state of northern in Sudan, was penetrated and a truce negotiated between both parties.

This truce has helped facilitate trade between Nubia and lower Egypt, led to the settlement of individual Arab traders in northern Nubia and the vicinity of Aswan in Egypt, as well as their intermarriage through the years. As a result, a new formation of nomads named Ababda, relating to genealogy of Abe Abida Ben EL-Graah, was generated.

Moreover, Nubia had ignored the religion of Islam for as long as 600 years until it was introduced due to intermarriage, Muslim invaders and Arab traders who took Nubian women for wives. This narrative mentioned helped Islam to present itself in Nubia as well as helped Nubians in maintaining their own culture, language and traditions by virtue of Nubian women and their passing on of tradition to the following generations (Anne, 1995).

1.2. The Nubian Exodus

When the High Dam had been constructed and as soon as it began operating in 1970, lake Nasser was formed and known to be the largest man-made lake in the world. As a result, Egypt gained many benefits from the High Dam such as providing electric power to all governorates, systemizing and maintaining the water and providing the process of Nile navigation with more safety. However, the high dam's construction still had downfalls such as preventing millions of silt, which could have enriched the surrounding agricultural lands shown in figure 1.

One of the major influences, or rather dramatic effects, enforced by the construction of the High Dam and creation of Lake Nasser was a flood over Lower Nubia. Villages were completely submerged by the floods and heritage sites relocated. The damage was not only inflicted upon Egyptian-Nubian populations but also flooded approximately 30% of Sudanese-Nubian villages (See figure 2).

Consequently, the exodus of all Egyptian and Sudanese Nubians became a reality and not a choice. In Egypt, almost all of the Nubian population departed to the north at Kom Ombo and Edna and some of them to the countryside, in different cities or around the world. And thus, the paradise was lost (Zohry & Harrell-bond, 2003).

Nubians are an ethnic group that make up a total of nearly 120,000 people. A number that represented, at the

time of exodus in 1963, almost 0.29% of the Egyptian population. Most of the people at this time were Kenuzi; a attribution given to those who settled near the Wadi Kenuz. Women began escaping with their children and old men to cities and the countryside. By 1950, approximately 70,000 persons, females and males, had left Nubia to settle in cities (Zohry & Harrell-bond, 2003).

Lost Nubian villages were growing along the Nile in quest of the water because of an economy that hugely depended on farming, animal agriculture and production of dates. The importance of the Nile shore for the Nubian people, regardless of the moral aspect, is summarized in its use as a method to trading goods and exporting products such as dates (El-Hakim, 1993).

1.3. The Emigration to Kom Ombo:

Nubians were left with no choice except one that leads to leaving their homeland and emigrating to search for another. The ministry of social affairs, a governmental department, provides an illustration of the plan set out for their emigration. The Nubians were regulated to:

- Rapidly starting to register the injured Nubian population in this disaster.
- Creating proposals of new villages and administrative organizations to make the emigratio integral to the community.
- Studying and putting principles for rehabilitation to educate the Nubian people before emigration.
- Subventions and contributions directive for emigration allowing them to move towards new communities (See figure 3, 4).

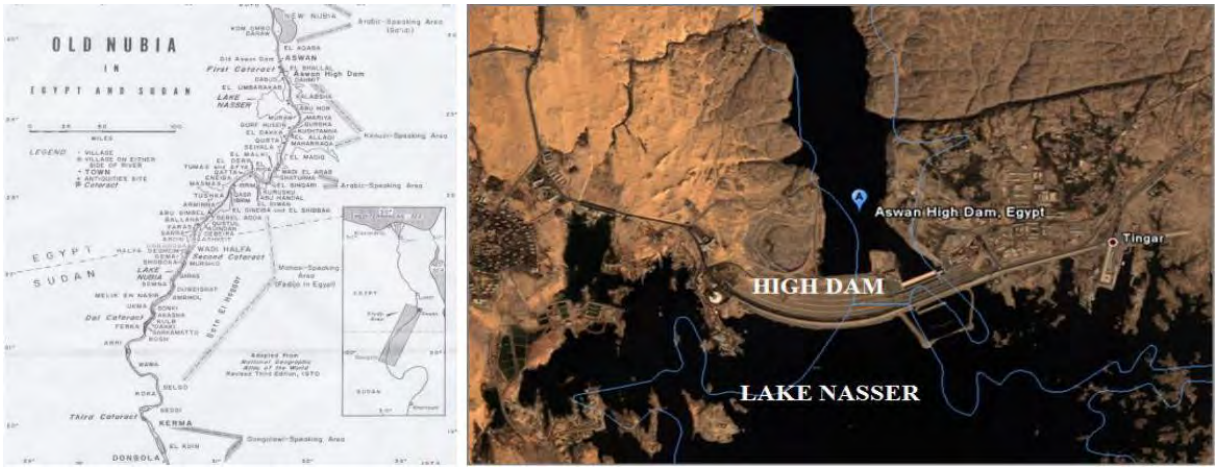


Figure 1. a. Depicts the limitation of Nubia. Figure 1b. Depictsthe location of the High Dam and Lake Nasser (Google Maps, 2018)



Figure 2. The figure depicts some picture of flooding of the old Nubian' s villages.

– Preparation and reclamation of land to be as compensational and replace flooded agricultural land (Anne, 1995).

All studies corroborated that Nubians had been razed socially, geographically, culturally and architecturally. Subventions lead up to changing centralization of relations of the society due to some Nubian precedence to indemnity with land and others money. Moreover, and due to agricultural land in Kom Ombo, it was not sufficient to Nubians who favored land hence the government's coercion to distribute land in sites such as Edna, Tommas and Afia.

The emigration to Kom Ombo took place, firstly, by river transport to Shellal, a port in Aswan, and then by land to their emigration site. Naturally, both methods resulted in excessive Nubian movement. Moreover, Nubians who emigrated from Nubia before this plan became deficient of any Subventions or land regardless of previously having owned and lost in old Nubia.

Unfortunately, implementation did not match the planning stages; many notes could be abstracted in the following (Zohry & Harrell-bond, 2003):

– The old Nubian villages, before the construction of the High Dam, were spread out accurately along the shore of the Nile with wide site. On the other hand, new villages in Kom Ombo were closed, clustered and crowded with house units, thus, contradicted the demands of the Nubian liaison with the Nile and their idiosyncratic nature.

– The house design was economical in terms of area and content as they were connected and cleaved together. A design Nubians rejected and considered a psychogenetic side to their nature.

– The location of water closets in new emigration houses had been badly located. Located near the main entrance and guest room, they were not viable for use by inhabitants since they were exposed.

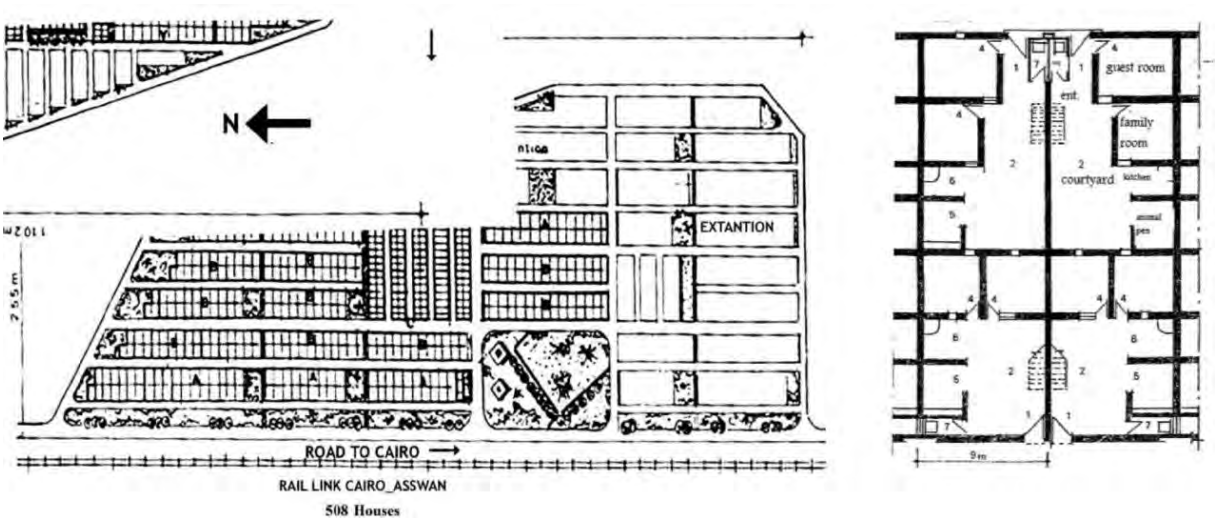


Figure 3. Depicts the planning Nubian villages and the Nubianhouse designed by the ministry of social affairs



Figure 4. Depicts the emigration of Nubians and the Nubianhousing in the new Nasser village

- As for materials used, the walls were of stone and rubble stone and the roofs were of reinforced concrete. Direct thermal transfer into the houses were then made possible through the roof.
- The emigration project of the Nubians was incorporated into a governmental plan of Egyptian rejuvenation. Consequently, the Nubians found themselves within a huge society. It became essential that they lived and embraced new and different traditions and cultures, which led to the loss of own culture, heritage and identity.
- Nubian unique architecture was then lost to a new concrete world and to this standardized dwelling; abandoned was their innovation.

2. Vocabularies of Nubian Vernacular Architecture

Description of the Village: A village in old Nubia consists of Nugu, a village that is located in parallel to the Nile's shore. There existed three kinds of Nubians in old Nubia: the Kenuzi from the north, the Arab and the Mahas from the South of the Kenuzi villages. All villages contain in their center (1) a main mosque, (2) a social center, (3) a post office and (4) a few shops. See figure 5.

The Nubian houses took a linear form and were ordered in rows that faced the Nile. The linearity always occurred due to the natural contours and geographical aspects involved. Facing the Nile River generated the interaction and intermixing between Nubian dwellings and nature, which generated a unique and natural fabric for villages in old Nubia (EL-Hakim, 1993). In larger communities, other communal amenities were included such as a village guesthouse, a fountain, or a mosque, as in the Arab district, which had a public water tap and adjoining toilet facilities.

The mosque has been subject to the main adaptation. Its original courtyard was covered with a vault to increase space and at the same time two new courtyards were added. The first form of the entrance to the mosque, alongside another at the back, is very large and has at one end a guestroom, a loggia and the washing area. Before and after modification, the mosque remained a complete entity and retained its sacred atmosphere. The whole village resembled a living organism, constantly growing and changing (EL-Hakim, 1993).

House locations: All houses in Nubia, and their main entrances, were located as to face the Nile River without obligations to geographic directions.

House doorways: Doorways were heavily decorated and demonstrated Nubian heritage. They were the main feature of adornment, which would be carried out starting with the entrance and continued to the rest of the house. Nubian families believed that their highly decorated and colorful doorway was an example of reverence towards the Nile as shown in figure 5.

Additionally, there was a side or rear entrance to the house, often used by women for daily chores. This type of additional entrance was used in linear extended houses depending on a need for direct access from the courtyard to the whole of the house.

Arrangement of the house: The open courtyard is the main focus of the house in which it could be accessed easily from the entrance as well as rooms adjacent. In the kenuzi and Mahas districts, "houses were structured along the lines of the extended family and were generally built in semi-detached terraces" (Safwat, 2004). Similarly, single residences existed, especially in the Arab and Mahas districts, where the houses were built with a square or rectangular shaped courtyard surrounded by a perimeter wall. Extra space in the courtyard was used to later allow for house expansions. The extended family simply expanded within the complex, adding rooms and storage as the family needed to grow.

The arrangement of a Nubian house was especially apparent in the courtyard. The courtyard was the central part of the house and despite its proximity to the main entrance, it remained private, sheltered and detached for members of the family as well as visitors. It was equipped with 'Mastabat', raised seats of stone or brick, along the walls, which made it flexible for most activities such as cooking, washing, sitting and even for sleeping during the hot

summer

nights. Nubians houses were sometimes divided into two-storey structures connected via staircases located by a corner of the courtyard, which would be found in north Nubia.

In some village specially Kenuzi and Mahas, houses had another courtyard, the rear courtyard was separated from the main entrance, it served the farmer who owned animals, it was directly connected with rear entrance which was easily for women to move through the house and from out to into the house.

The living room and Khayma: Living rooms were either open to the courtyards while some rooms had high wall-to-wall openings above the door. There existed flat roofed spaces, facing living rooms such as tents, known as a "khayma", that were covered with palm branches and stems (El-Hakim, 1999). More like a loggia, it was a covered sitting area along the open courtyard, which had higher end walls, and consequently a higher roofline, raised by brick columns that are as high as one meter. This resulted in an improved air circulation and maintenance of the space to cool during summers.

Guest room and The Mandara: Nubians were friendly people and displayed their affability by caring for the guest rooms as they considered it to be an important part of the house. The guest rooms usually had separate entrances to allow the guests some freedom in movement as well as maintain the privacy of the inner family quarters.

Roofs: The Nubians of the Mahas and Arab districts used split palm trunks to construct their roofs and wood beams made of acacias. Palm reed thatch and woven palm fronds covered the beams. In the Kenuzi district, however, roofs were constructed as centenary vaults and domes (Figure 5).

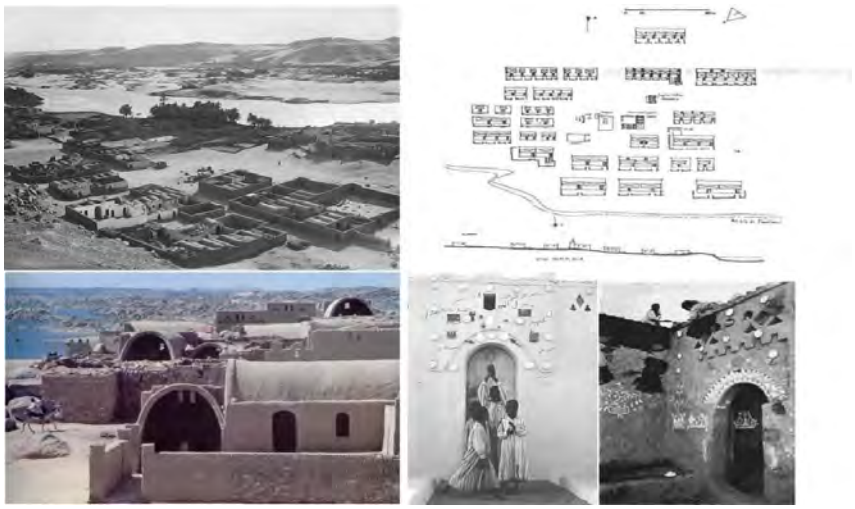


Figure 5. The vocabularies of old Nubian architecture

Doors and windows: The Nubians supported for the windows were placed in the walls during construction, and the doors and windows were shaped reaching of the walls. In order to provide privacy and reduce the area exposed to the heat and glare of the sun, the windows were built as narrow slits located just below the roof.

External plastering: Especially in the Kenuzi and Arab districts, houses were generally whitewashed. The exteriors of the houses were plastered with a mixture of mud, clay and rock salt from the adjoining rises.

The shapes of kenuzi houses were special. The women and children of the family plastered and decorated the interiors and the exteriors of their homes with bright, bold and colorful designs using paints made of calicoes, ferrous and bauxite compounds available in the area. The designs often symbolized the arts of Nubians they draw many objects such as plants, trees, cars, and airplanes or sometimes described the Nubians people when the hajj returning from the holy city of Makkah.

Ventilation: The courtyard allows fresh air and sunlight to circulate through and move into was the internal part of the dwelling via internal openings such as doorways and sometimes medium sized windows covered with wood shuttering. This acted as a ventilating device and a "private piece of sky" for the benefit of the family. Glass was

very rarely used since it had to be brought from Aswan. The very small windows lying just below the rafters or vaulted roofing allowed hot air, rising from within a room, to escape and fresh air to enter from the courtyard (EL-Hakim, 1993).

Catenaries vaulting: The vaults were made of roofing that is used today in many parts of the Mediterranean, the African continent and Latin America. The earliest recorded evidence of mud brick construction using a catenaries roof was found in Egyptian Nubia at the fortress of Kuban, a little south of El-Dakka on the east bank of the Nile as shown in figure 6.

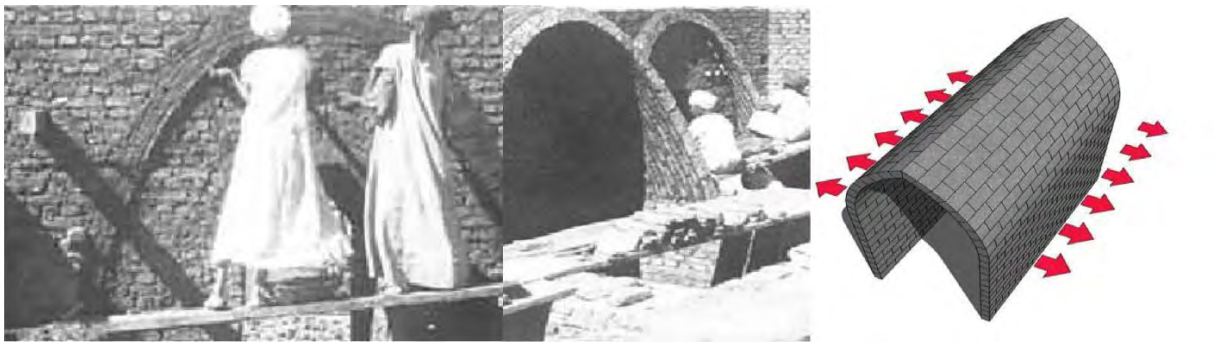


Figure 6. Depicts the roofing methods using the vaults

The bricks used for vaults had special dimensions of 25*15*5 cm and contained more straw than usual to allow for improved lightness and strength. Without scaffolding or centering, the mason roughly outlined the parabolic form of the vault in mud on the end wall of the room, which was raised higher than the rest (EL-Hakim, 1993).

3. Nubians Economics

The economics in Nubia is dependent on the export of dates as it were the basic source of income for all of Nubia before the building of the Aswan High Dam. Since then, trade had prospered in parallel with the consecutive enhancement of the dam and Nubian flooded date palm orchards. See figure 7. Between the closing and opening of the dam; the floods of the Lake, increase and decrease of the Nile, cultivation became legalized along a narrow strip of land for only four months of the year. Major year-round agriculture was incomplete to the southern district of the Mahas, where the dam reservoir did not greatly affect the agricultural land.



Figure 7. Depicts some images of Nubian industries

Although the Nubian was completely close to the Nile's shore, fishing never became an important source of income or nutrition in Nubia. Livestock, however, existed in large quantities during the summer when the nomadic tribes of the Eastern Desert would graze their camels, sheep and goats along the banks of the river before traveling north at the end of the summer to souks in Aswan. Similarly, textiles in Nubia was an irregular industry but was particularly taken for a practice in houses or in small shops to sell in small and close villages (Robert A. et al, 1973). Nubia has a great potential in maintain a sustainable economy by being a main center for the exchange of commodities with different cities in Africa. Its location make sit eligible to contain a dry port that can promote Nubia as a global hub for trade (Amer, 2018).

3.1. Nubian Traditions

Believed to be the first human race to roam the earth, Nubians are known to have passed down their customs and traditions to ancient Egyptians. They are people known for their artistic nature, sheer honesty and simplicity. Known to the Greek as Ethiopians and their land 'the land of punts', they find comfort in living by the bank of the Nile. As for family, a Nubian prefers to marry from the family such as a cousin and celebrate with a ceremony that could last for up to 40 days allowing a proper practice of rituals. For instance, one of the understood rituals include the purchase of garments and several gifts by the groom for the bride, her mother and sisters as shown in a series of images in figure 8.



Figure 8. Depicts some picture of Nubian traditions.

According to Thomas , "These presents are boarded on a camel and adorned with decorations such as colorful silk fabrics and jewelry. During the wedding ceremony the groom is well-dressed, holding a sword and a whip" (2015).

Known for their peacefulness, Nubians have displayed evidence of their brilliance and serene existence that has added to the tribe. As a result, indicated was a fact that they were not pretenders or slaves.

Moreover, jewelry was a Nubian women's favorite form of decoration as they normally covered their bodies by accessorizing. Women often wear necklaces around the neck topped by two lines of jewelry bearing the divine name of Allah (Thomas, 2015).

4. Return to the Homeland

The difference between the architecture of new Nubia planned by the Egyptian government as and that of old Nubia has had a dramatic effect on the identity and consciousness of Nubians. Nubians who relocated at Kom Ombo and Edna had begun to voice dissatisfaction with their treatment and began to form cooperatives to rebuild their homes on the shores of Lake Nasser.

The Nubians of Kom-Ombo lined themselves to create a cooperative and decided to return immediately after a government decree was issued allowing them to return to old Nubia. Other cooperatives were formed at Abu Simbel, Sadat, Wadi Alaqui, Qustul and Adindan, these townships were the first to return to old Nubia in 1977. It is the migration of this last community, consisting of Qustul and Adindan Township (Obluski, 2006).

Some Nubians started to, single-handedly, build houses in different locations in the western artery of the Nile in Aswan. Building them how and where they needed, now one of these areas is named western Aswan village, one of the largest filled with Nubian inhabitants.

During the process of their emigration, Nubians established groups and designed websites to promote their cause, in all governorates, to challenge the government to help them in returning to their homeland. Successfully, the United Nations provided its support in 1987 and recommended, after the lake of the High Dam was closely located, to rehabilitate the Nubians along the shore of Lake Nasser.

4.1. Geographical Limits of old Nubian villages

Old Nubia was located between the first and sixth cataracts of the Nile River. The first bounded the land of Nubia from the north and the latter bounded it from the far south, which was located north of modern Khartoum. Tribes living in the area, at different periods, consisted of diverse ethnic groups at times and politically complex kingdoms at others.

Furthermore, Egypt bordered Nubian from the south and its close proximity resulted in its frequent domination of the area. However, Nubia still flourished and prospered during the times it was free of the Egyptian state. Their peak, economic independence, and formulation of kingdoms of great dynamism took place during those times (3050 BC) and onward. (Obluski, 2006).

4.2. Lake Nasser

As established, the construction of the High Dam of Aswan took place in the 1960s. Known as the largest man-made lake in the world, it plays a huge role in supporting industries of Egypt. One of its most affected is fishing as it yields from 15,000 to 25,000 tons per annum. On another hand, hopes that the lake would then provide agricultural support remain.

Moreover, the dam is 298 miles long, 10 miles wide and could hold a water capacity of up to 130 million acre-feet. 24 million of the 130 are “dead storage for sediment and 73 million acre-feet as live storage” according to the (Britannica Encyclopaedia, 2017). According to the source, about one-quarter of the Nile flowing into the lake is then lost to evaporation and leakage.

4.3. Climate

The Nubian area enjoys a dry, mild desert climate. Without too much humidity, comfort is mostly sensed. During winter months, the area does not suffer heavy rain but experiences it in light and rare episodes. Nubia experiences wind during winter months, usually from December and until the end of February, and rarely ever during summer time.

The area’s temperature varies during each month: from October to April, the weather reach a slow as 8 degrees Celsius while from June to September it would be hot and dry. However, the hottest months are known to be August and September as it could reach 40°C. During the day, the average temperature ranges from 30 to 35 degrees Celsius and often reaches lower numbers by the Nasser Lake due to the water’s cooling effect (Climate: Aswan, 2015).

5. Proposal: Rehabilitation of Nubian Settlement Along the Shore of Lake Nasser

The idea to rehabilitate the Nubian area stems from a notion of relocating lost Nubian villages and moving flooded sites along the shore of Lake Nasser and parallel to the old site using the same old names. The location of the Nubian village must be near the Nile shore that will identify with hypostasis of the Nubian people and provide them with the chance to reclaim their wealth. See figure 9a. The village of new Kalabsha in the west Bank of Nile awaits in-depth studies, plans and design proposals. Accordingly, other villages will undergo rehabilitation alongside proposals for new Kalabsha. See figure 9b, table 1.

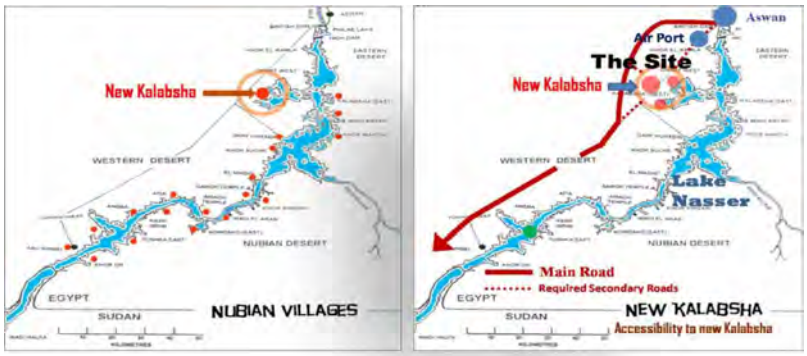


Figure 9. a (right): Depicts the relocation of all Nubian villages along the shore of Lake Nasser. b (left): Depicts the new location of the Kalabsha village.

5.1. Site Potential and Available Resources

This area provides a high potential for foreshore agriculture. However, environmental, ecological and economical aspects must be considered within this development. There is also a high potential for upland agriculture. The main criteria for potential areas are the soil quality, the distance to the lake and the altitude. Other important resource in

Table 1. Depicts the context of the chosen site and itsaccessibility as well as the requirements that maybe added to the site fordevelopment.

Site	Roadways		Waterways	Railways	Airways
	Main Roads	Links			
	There is only one Abu Simbel. This well paved road in the region; it connects Aswan and road is also of great importance in view of the Tushka development.	Linking roads road. connect the main road to the Aswan airport	There is no to other cities proper transportation of products by ships except to Aswan.	NA	An airport near Aswan and one in Abu Simbel
Requirements	The main connection should be extended to Cairo and the Nile Valley	The costal track should be constructed as to link Kalabsha and East Tushka.	The boat lines should be improved but more for tourist purpose than for other transportation.	Parallel to the main road, a new railway line between Aswan and Abu Simbel should be erected	The market access through airways is an important feature and both airports should be improved

all Nubian areas that is cultural tourism, Kalabsha city will be as a model for all Nubia; this will be a good resource to fund development of Nubia

5.2. Contemporary Nubian Architecture

Regarding the previous study about Nubian architecture, the new vision for Nubian residences should incorporate a shared and main concept that highlights the Nubian culture and heritage. Additionally, and alongside the rapid and over-development in the life of the Nubian, the house should combine the generic concept of house designing and the new needs for current and civilized generations.

- All of the houses and its entrances should face the shore of the Nile to enhance the relation between the people the Nile.
- The houses must be divided according to Nubian ethics and traditions while considering climatic treatments as shown in figure 10 below.
- The streets should be narrow and winding to increase shadows along streets and to increase the specialty.
- The site topography should be maintained according to use and distribution as to formalize the urban fabric of the village. The village should contain a variation of resources of sustenance such as commercial, industrial, agricultural, fishery, managerial or educational. See figure 11.

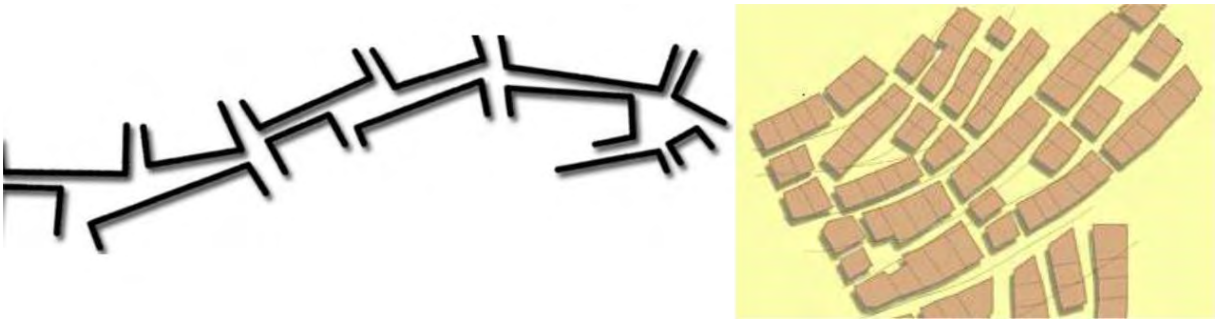


Figure 10. a (left): Depicts the street spaces and design that give more shade to pedestrians. b (right): Depicts the fabric of the village and provides Nubians with an experience similar to those of their original homes.

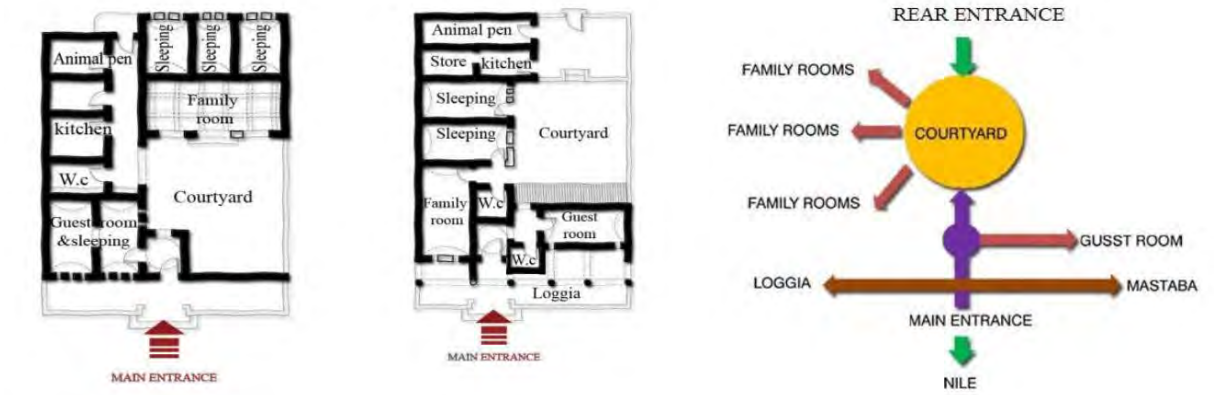


Figure 11. Depicts the diagram of the new Nubian house and twoalternative samples

- Alongside the contents of Nubian houses, the supplementation of new content will be fulfilled in a way as to meet needs of civilized Nubians. Added elements include: one more toilet, bath room or guest room. Other additions may encompass separate entrances for guests or replacing other bedrooms with guest rooms.

– The courtyard should be developed and may be divided into two parts; one for family and another that is semi-closed to contain the *mandara*. The division of the courtyard may increase the shadows and increase the specialty.

– Modern needs such as television or internet access and modern fashion of decoration or furniture will be considered without neglecting culture or identity.

– The local materials for walls and roofs should be used in new villages.

– The same style of building or finishing should be adopted, with minor developments yet identical characteristics, in service of construction techniques. For example, the vault may now be built easily as opposed to earlier times. With acknowledgment to modern techniques and experienced workers, the vault may be built in two directions to create a better flow of air.

– In summary, the needs of the Nubian people should be considered in this process of rehabilitation to help them in rebuilding and maintaining their identity and heritage.

5.2.1. **Developing the Vault**

The vaults in new Kalabsha will develop to increase air flow inside the house; the idea will take original construction methods for ease, however reposition the vaults in opposing or crossing directions to catch the air if the wind direction is changed as shown in figure 12.

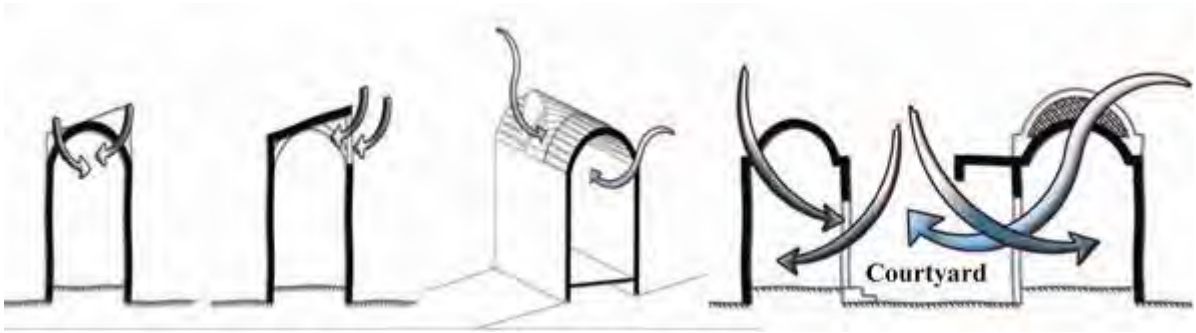


Figure 12. a, b (left and middle): Depicts the new type of crossed vaults. c (right): Depicts the new two-level vaults.

The vaults also take other shapes as they may be in two levels to increase the area of small openings in vaults towards the wind. In this case, high levels of vaults will create a wind-catcher effect known as a *Malqaf* as shown in Figure 13.

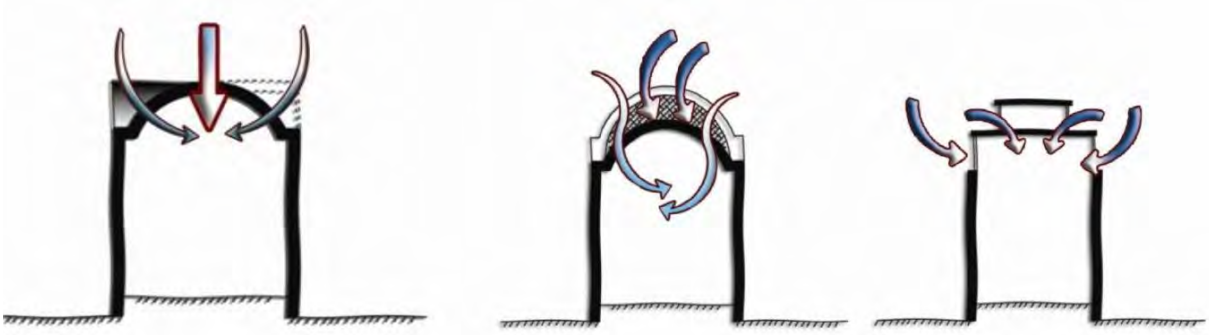


Figure 13. Depicts the natural ventilation using the vaults

5.2.2. **Settlement Distribution**

Proposal of Kalabsha city will divide to mother village, and two cluster villages, the cluster Villages will locate near the shore because of three main reasons. The first reason is foreshore agriculture, best suitable up to a lake shore altitude, while the second is potential highland agriculture. The third and final reason is to maintain Nubian culture, identity and quality. Figure 14 below, accordingly, presents the proposal of Kalabsha Village visually on a map.

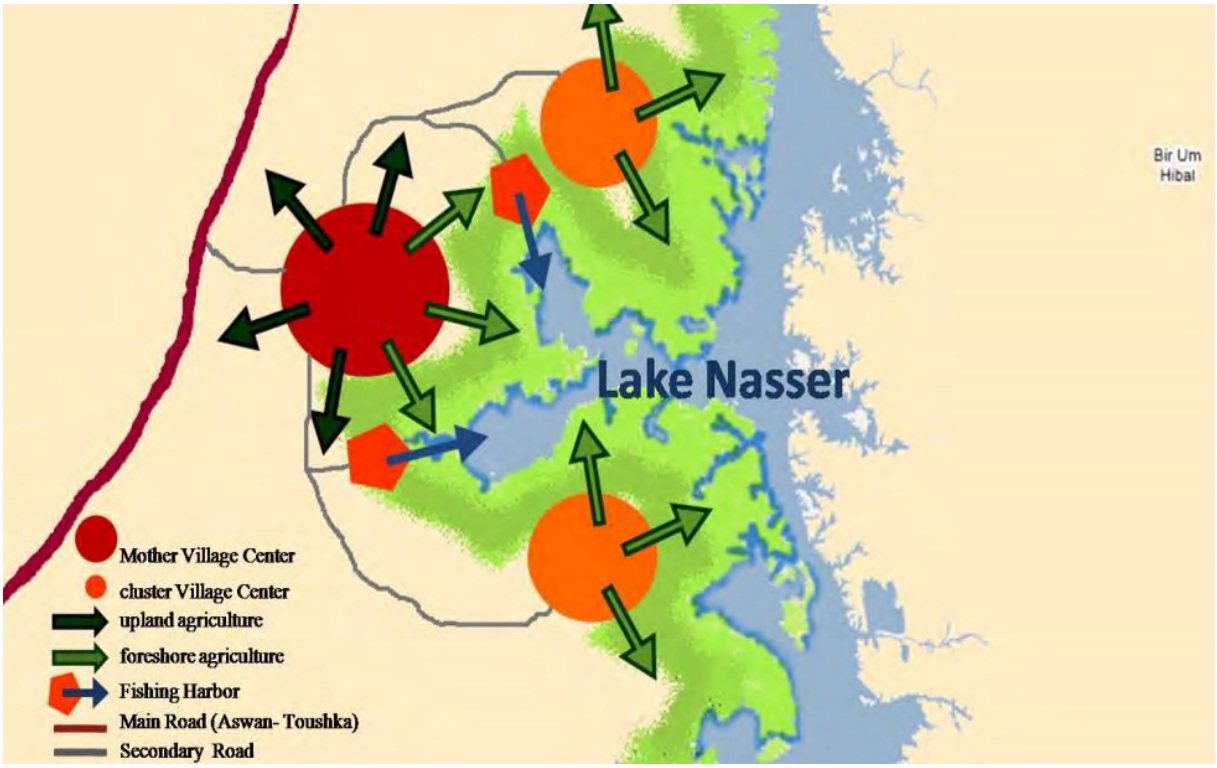


Figure 14. The proposal of Kalabsha village.

To reach sustainability, settlements should not rely on a single economic factor such as upland and foreshore agriculture. The mother village in the center concentrates on upland agriculture and the services it provides. The distribution must include direct links connecting to the clusters. Providing connection between the clusters is important for the exchange, trade and transportation of goods, products, specialized services, employment opportunities, communication, and establishment of rapid access. The clusters connected with a direct link to the mother village and to the main existing road help clusters in further developments.

5.3. Sustainability and Future Growth of the New Kalabsha

Although the ecological resources assist in the sustenance and development of Kalabsha, the design of the city should consider sustainability and the city's future growth. The alternatives to funds and resources such as agriculture, fishing, trade, and tourism must be found as they are necessary for city growth.

The artery of the Nile and the connections between clusters, the mother village and the main roads will define the city's future growth. The growth will continue as to reach the main border through the growth of clusters and their attachment to the mother village.

6. Recommendations

The rehabilitation of Nubia is needed since the stability is possible by Lake Nasser. Nubian rights to return back to their homeland will help in the development of southern Egypt instead of their scattering in many different cities. Participation of the public is also necessary to develop further rehabilitation plans and benefit from different ideas and opinions. This process has been ongoing in Egypt for many purposes; it assists decision makers receiving the feedback of citizens in projects before acted as to ensure a successful future (Amer & Aly, 2011). This specific gap was noticeably present in the emigration project; therefore, this paper recommends that decision makers consider this process in order to achieve just results. The paper also encourages Nubians to uphold their traditions and pass on their culture to following generations.

References

1. Aly, S. S. A., & Amer, M. S. E. (2011). Public involvement in sustainable development: a public participation process in the Sidi Gaber railway station development project, Alexandria, Egypt. *WIT Transactions on Ecology and the Environment, 150*, 537-552.

2. Amer, M. (2018). The Dry Port as a Holistic Approach for the Relocation of City Gateways. *The International Journal of Environmental Science & Sustainable Development, 2*(1), 1-11. doi:10.21625/essd.v2i1.168.g70

3. CLIMATE: ASWAN. (2015, August 09). Retrieved April, 2018, from https://en.climate-data.org/location/6344/

4. El-Hakim, O. M. (1993). *Nubian architecture: The Egyptian vernacular experience*. Zamalek, Cairo: Palm Press.

5. El-Hakim, O. M. (1999). *Nubian architecture: The Egyptian vernacular experience.* Cairo, Egypt: Palm Press.

6. Encyclopædia Britannica. (2017). *Lake Nasser*. In Encyclopædia Britannica.

7. Fernea, R. A. (1973). *Nubians in Egypt: Peaceful people* (1st ed.). Austin: University of Texas Press.

8. Jennings, A. M. (1995). *The Nubians of West Aswan: Village women in the midst of change.* Boulder: L. Rienner.

9. Obłuski, A. (2006). *The formation of the Nobadian State. Social changes in Lower Nubia in Late Antiquity.* Retrieved April, 2018, from http://www.academia.edu/462097/The_formation_of_the_Nobadian_State._Social_changes_in_Lower_Nubia_in_Late_Antiquity

10. Safwat, A. (2004). *Solar Architecture & Computer: The Effect of Nature on the Shaping of Residential Buildings at Nasser Lake Zone.* (Unpublished master's thesis). Ain Shams University in Cairo. Retrieved April, 2018, from http://www.cpas-egypt.com/pdf/Ahmed_Safwat/M.Sc/001 Introducation.pdf

11. Thomas, I. (2015, December 3). Nubia and the Noba people. Retrieved April, 2018, from http://www.blackhistorymonth.org.uk/article/section/pre-colonial-history/nubia-and-the-noba-people/

12. Trigger, B. G. (1976). *Nubia under the pharaohs*. London: Thames and Hudson.

13. Zohry, A., & HARRELL-BOND, B. (2003). *Contemporary Egyptian Migration: An Overview of Voluntary and Forced Migration*. Manuscript in preparation, American University in Cairo. Retrieved April, 2018, from http://www.migrationdrc.org/publications/working_papers/WP-C3.pdf