THE ROLE OF LAKE NASSER IN THE INVIRONMENT AROUND AN APPLIED STUDY IN WADI ALLAQI

BY
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Introduction

A result of the construction of the Aswan High Dam, Lake Nasser was created. Several possibilities were laid down to undertake research investigations in several fields and problems for optimum exploitation of the lake region natural resources. Several important subjects were taken into consideration as:soil, geomorphology, hydrology, natural resources, agricultural studies, public health and animal health problems, transportation. fishing and tourism.

Due to the location of Wadi Allaqi, it was influenced by the lake, since it is the largest compared with many valleys running into Lake Nasser. It is a major dry river which begins from the Red Sea hills towards the nile valley in Southern Egypt. When the Aswan High Dam was built and Lake Nasser was created,the lake was filled in 1967, and water entered the mouth of Wadi Allaqi, so. the valley has become a part of the lake. About 80 km of the valley inundated and remained under water for several years.

In the early 1980's, rains in Ethiopia were unusually low, resulting in a significant fall in the level of Lake Nasser, as the water receded, some of 40 km of the valley bed were explored revealing a layer of Nile silt which had accomulated during the years of inundation. This was quickly exploited for small scale agriculture by some of the nomadic people.

The creation of Lake Nasser has had effects on underground water, soils and vegetation, in areas of about 200 sq. km

bordering the lake. Such effects are particularly marked in Wadi Allaqi. Between 1981 and 1990 many attempts were made to help the tribes people passing or living in Wadi Allaqi to adapt the new conditions. Wells were dug, trees were planted, a surghum and vegetables were grown in small irrigated plots, a communal building including a clinic and a school was erected. Unfortunately these early attempts at development were partly successful. So, the careful planning is necessery to develop the valley.

The purpose of this field study is to throw light on the infleunce of Lake Nasser on the environment around, and to focus on Wadi Allaqi to set out ideas relating to it's location, climate, geology, soil, mineral resources, water resources, population, human activities and to explain the nature of the existing economic system in Wadi Allaqi.

1) LAKE NASSER

General Features

Lake Nasser is located in the southern sector of the Egyptian territory (Map 1), in an area which is given the name "lower Nubian Plain". This lake is one of the largest man-made lakes upstream of the Aswan High Dam on the Nile. The Dam was completed in 1969, and the lake extends along the river Nile for about 480 km south towards Sudan territory. The impact of this recently formed Lake on the overall physical environment of the area around it.

The lake covers an area in Egypt of 5237 sq km (1) at a level of 180 metres relative to sea level. The rest of the lake is located in Sudan called "Lake Nubia". It covers an area of 1038 sq km. The total reservoir area is 6275 sq km, which is bounded by latitudes 20 27 to 23 24 north, and longitudes 30 7 to 33 15 east, and situated between the Aswan High Dam and Dal Cataract. The lake region in Egypt is bounded by latitudes 22 to 24 north and longitudes 31 to 34 east.

The water level in the reservoir does not vary only on an annual basis (fig.1), but it varies also seasonally within the same year. The lowest level is reached at the beginning of the summer before the waters of the new main flood pour into the reservoir, while the highest level is attained at the end of the autumn following the main river flood (2).

Lake Nasser, being situated on the eastern side of the Great Sahara Belt Shore in the climate conditions of arid zone. This belt is borded in its northern side by the mediterranean belt

EVOLUTION OF WATER LEVEL
IN LAKE NASSER

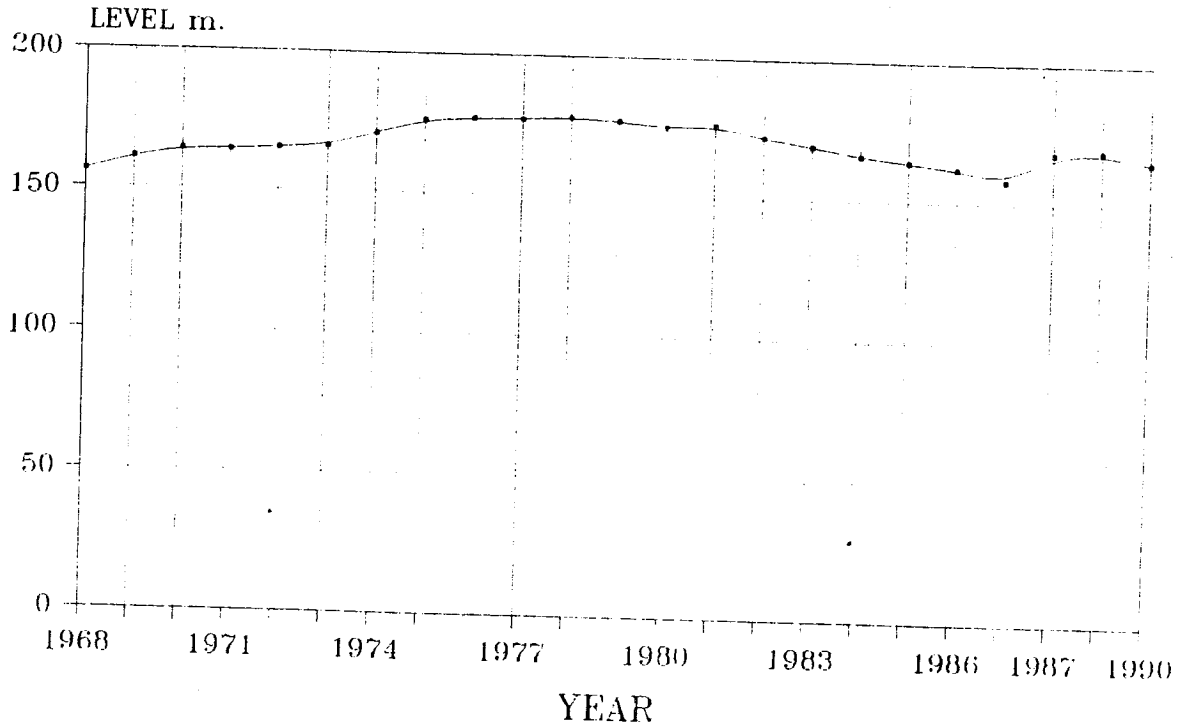


fig - 1

(winter rainfall) and on its southern side lies the Tropical Rain Belt (mostly summer rainfall). This area including Lake Nasser receives a virtually no rainfall, except for occasional thunderstorms in winter which may penetrate the area on the average of once every ten years.

From the meteorological observations, temperature records show that January is usually the coldest month, with high temperatures prevailing from May to September. From November to March, the climate is delightful, with cool nights and clear bright days (3).

Humidity is low. During the early stages of the development of the lake, the clouds were rare, but in the last years it was noticed that clouds started to increase especially during winter season.

The prevailing wind direction is from the north or northwest, with only an occasional strong wind, usually accompaning the passage of a depression which moves from west to east along the medeteranean coast, and the calm conditions prevail between 25 % and 50 % of the time. Between March and June, perhaps two or three times a year, there will be strong easterly winds, accompanied by increased temperatures and followed by dry, hot southerly winds. these storms may occur for two to three days and lift sand high in the air and occasionally develop into real sandstorms. Other sandstorms occur in summer, mostly during June and July, When strong southern and south western winds develop along the edge of the summer storms.

2) WADI ALLAQI

2-1 Location

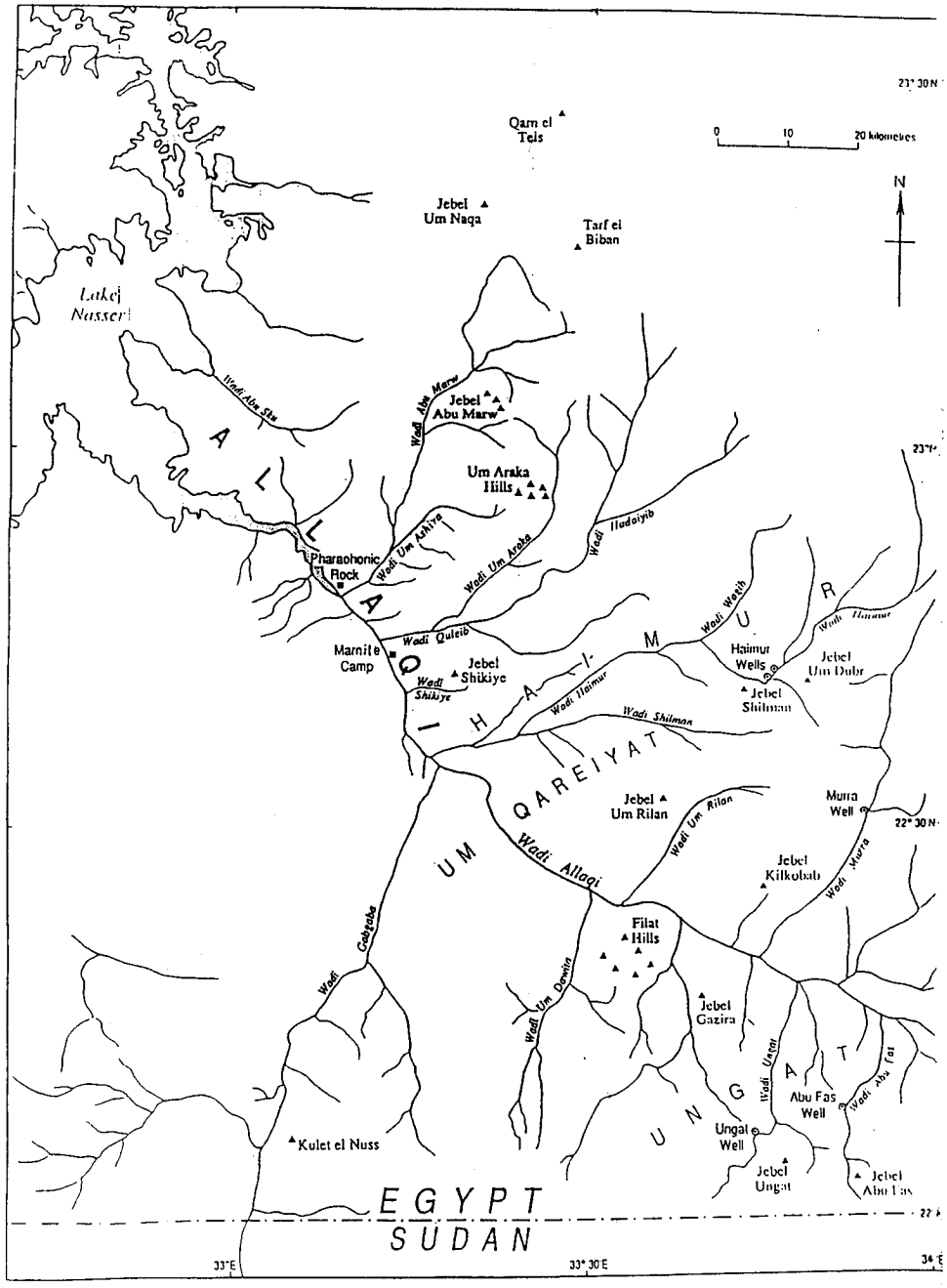
Wadi Allaqi is located about 180 km, south of Aswan. It lies on the eastern side of Lake Nasser (Map 1) between latitude 22 to 23 north and longitude 33 to 34 east. It extends for 275 km long from north - West to south - east with an average width of about one km.

The route to Wadi Allaqi crosses Sikket El Baronad, Wadi Dahmit, Wadi Um Hebal, Bargat El Tokham, Wadi Abo Herigil, Wadi abo Marw and Wadi Um Ashira (4) which runs into Wadi Allaqi close to the present avarage location of the shore line of Lake Nasser.

Wadi Allaqi lies in an important geological boundary between basement complex igneous rocks to the east and Nubia sandstone to the west.

2-2 Climate

Wadi Allaqi is located in the hyper-arid Eastern Desert region of southern Egypt. Average summer day time temperatures exceed 40 C, and summer maximum daily temperatures commonly exceed 50 C, making this area as one of the hotest places. In winter, by contrast, minimum temperatures approach 0 C, but it is comparatively mild. The relative humidity varies between 10 % and 60 %. The area is virtually rainless with rare precipitation occuring in storms of short duration though considerable intensity occuring at long intervals. It occures on average once in five years.



Map (1) Location of Wadi Allaqi Region

2-3 Geology and Relief

Wadi Allaqi lies on a boundry zone between complex rocks to the east and Nubian sandstone to the west. Overlying the solid rock outcrops in the wadi is a continous cover of superficial deposits (5). These are alluvial, sheet wash, wind-blown and pedimental in origin. Sections through these deposits such as those occuring at wells show that their thickness though variable is generally considerable, typically in the range 10 - 30 metres. However the evidence of stratification and sorting support the water-borne source of the majority of deposits though the soft alluvial. It is likely there for that the deposits were pricipally laid down during a period of wetter climate during the Holocene.

Most of the superficial material in the wadi was deposited at that time. Contemporary floods have their influence, as was observed in August 1980.

Scoring of flood channels has been accompanied by sheet wash, and redeposition at the edges of the wadi or more extensiveley over flatter sections of the wadi.

The generally flat water-deposited alluvial materials in the wadi floor have potential for natural vegetation and crop growth. The superficial deposits provide reasonable soil parent material when water for plant growth is available as clear from the spread of more demanding riverain vegetation types.

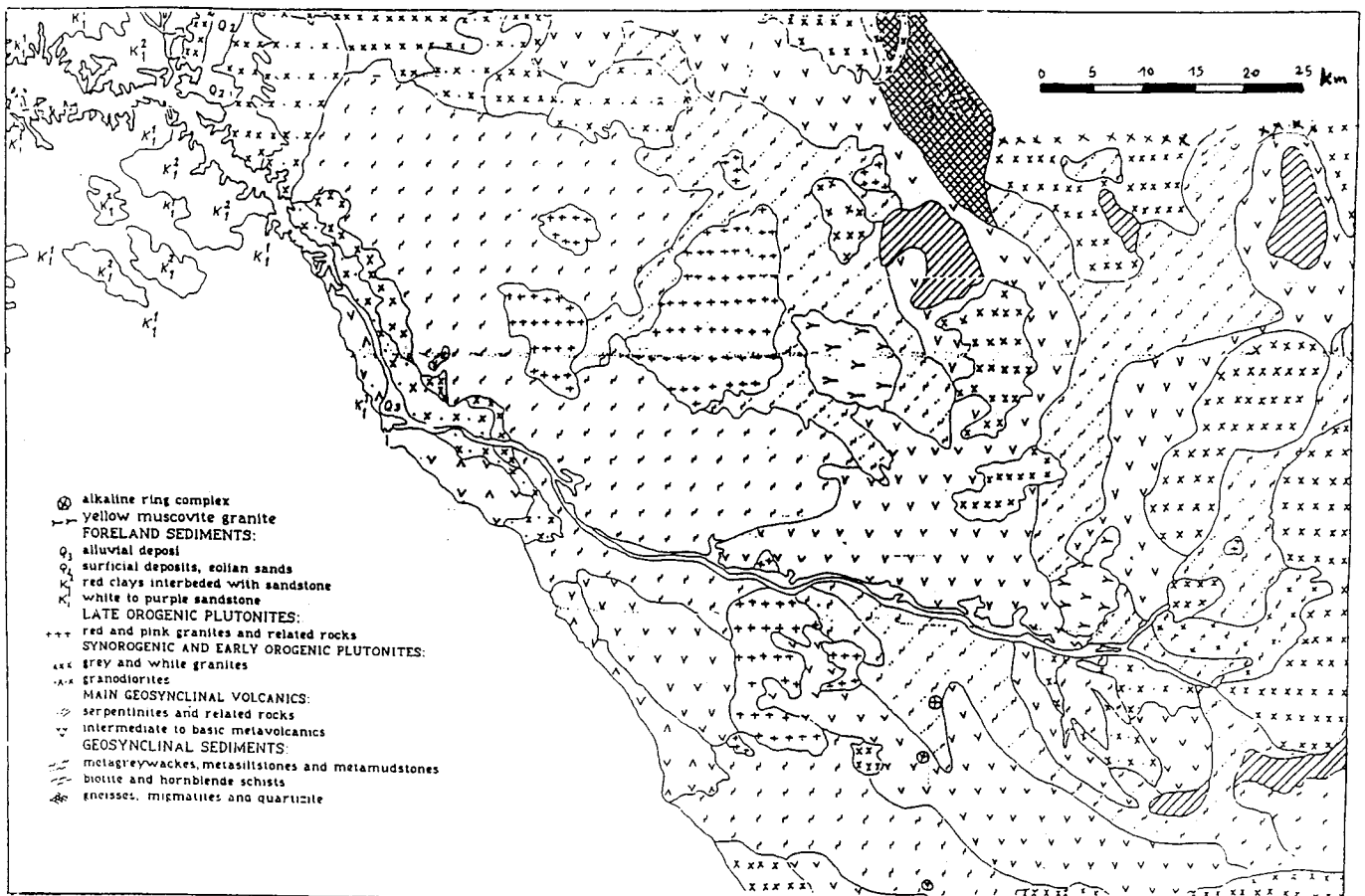
The level of Lake Nasser varies over both seasonal and yearly time scales. This is related to inflows to and out flows from the reservoir. It results in considerable variation in the

location of the shore line at any point in time, and has major consequences for hydrogeology. An important geological characteristic of the wadi is therefore the aquifer properties of solid and superficial materials. Nubia sandstone underlying the south-west side of the wadi is a good aquifer and is known to contain very large quantities of water at depth. The source of this water is undoubtedly ancient, and similar in age to the main alluvial deposits in the wadi. It appears that the basement complex rocks have certain water storage capacity related to their break down, and fracture approach the surface. Water is transmitted rapidly through the alluvial deposits in a vertical dimension. This can be observed in the following retreat of the lake shore when the water surface appears to descend at a rate of about one metre per month. Much less is known about leteral movements from water table fed by Lake Nasser. These appear to be rather slower, but given the continous feed from the lake and the very gentle gredient of the wadi are likely to be of greater significance in the long term.

The patern of surface geology in Wadi Allaqi area is shown in map 2. Besides the recent superficial deposits six main types of solid rocks are recognised as follows:

A) Geosynclinal metasediments of various types including hornblend, biotite and graphite schists, metagreywacke, metamudstone, phyllite slate and some conglomerates.

B) Geosynclinal metavolcanics including metarhyolite, metadacite, metaandesite, metabasalt and pyroclastic rocks.



Map (2) Geology map of Wadi Allaqi

Source, Abdel Monaim Mekki and others, geology and mineral resources in Wadi Allaqi

C) Serpentinite and serpentine, talc and carponate related rocks.

D) Old granite.

E) Young granite.

F) Nubia sandstone.

So the geology of Wadi Allaqi area provides a good base of mineral resources.

2-4 Mineral Resources

As said the geology of Wadi Allaqi area provides a good of mineral resources which will complement the soil and vegetation resources. The mineral resources Shown in maps are:

A) Gold: this is located in : Huimur, Um-Gerayat, Abu fas, Filat, Marahik, Murra and Negib. Gold mining has occured in the Allaqi area since pharaohnic times. The Haimur mines are mentioned in the bible and mining only ceased in the 1930's. It is profitable at the present time to produce gold due to the modern technology and the high price of gold.

B) Copper and Cupro-nickel: this is located in the north of Wadi Allaqi at Abu-Swayel.

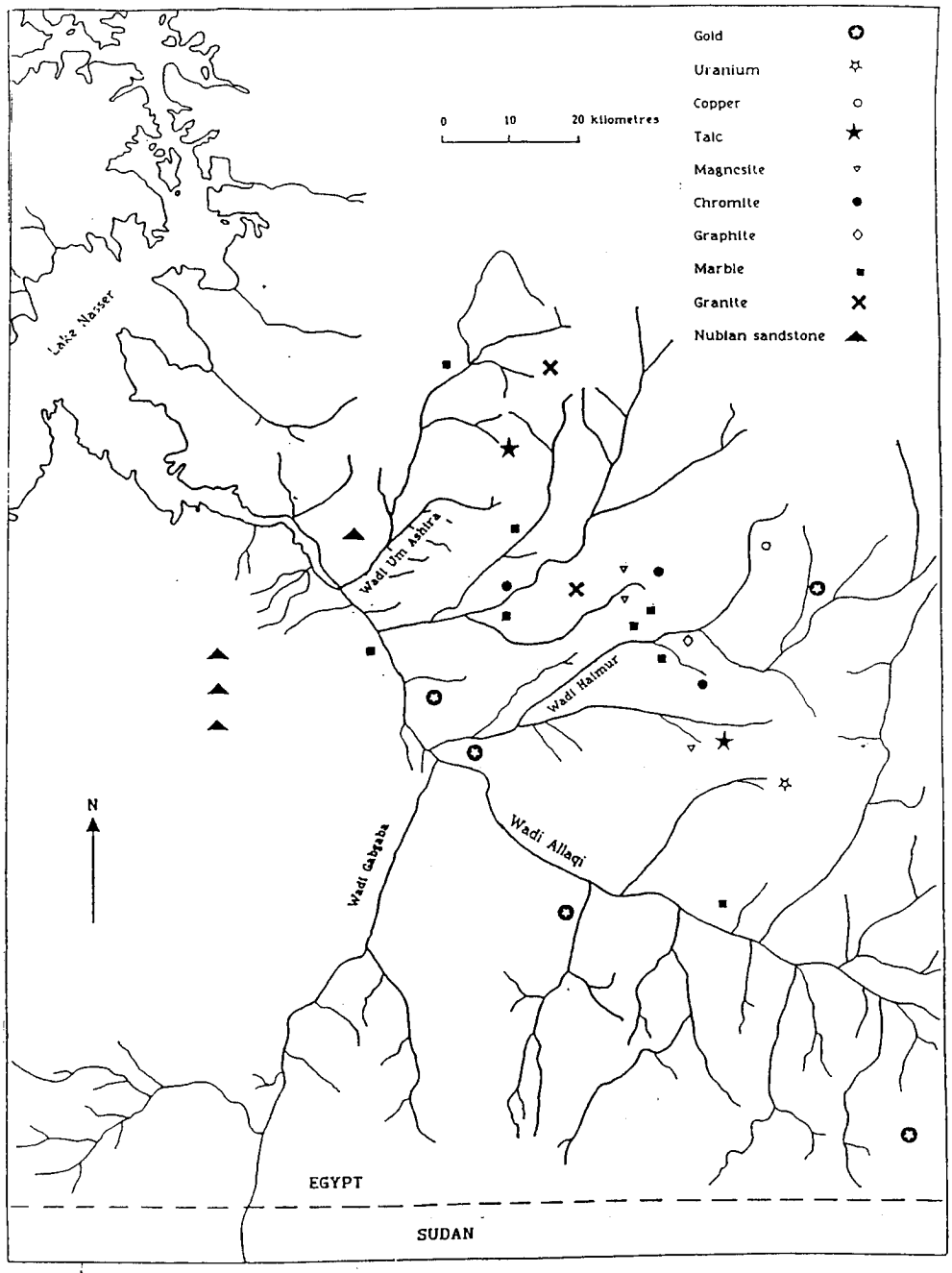
C) Chromite: this occurs at Um-shilman, Deenneibet El-Quleib, Haimur and El-Muksim.

D) Uranium: this occurs at Gebel Um-Ara.

E) Talc: this is found in exploitable amounts at Wadi Haimur, Wadi Um-Shilman and Gabel El-Hammary.

F) Graphite: this is found at Wadi Haimur.

Ornamental and building stone is a further important geological resource in the Wadi Allaqi area. Existing



Map (3) Distribution of mineral resources in Wadi Allaqi

exploitation of these resources has been one of the present. To facilitate the transport of these materials a hard surface road from Aswan to Wadi Allaqi is under construction and now covers most of the distance between the two. Two materials are quarried at present. Marble exists in large amounts at Um Araka, and in the Wadis of Quleib, Haimur, shilman and Abo Sweyil. Seven different types of marble are distinguished tremolite, graphite, tremolite - forsterlite - graphite and quartz. It has been estimated that there are more than 300 million Cubic metres of extractable marble in a variety of coulours (white, black, green, yellow, buff, pink, and banded grey - white) in these various sources.

The Marnite Company was setup in mid 1970's to exploit these resources from the best locations in the Wadi Allaqi. This Company produces high quality grey granite. The area has further good quality building stone for general use particularly certain outcrops of Nubia sandstone, together with deposits of sand and gravel suitable for aggregates. On the road to Allaqi close to Aswan city these are deposits of barite.

2-5 Water Resources

The creation of Lake Nasser has had effects on underground water, as well as soils and vegetation on areas bordering the lake. Such effects are particularly marked in Wadi Allaqi.

About 50 km of the original lower wadi area has been permanently inundated. Above this is a zone of about 40 km long and one to two km in width which has experienced periodic submergence. This is related to fluctuations in the level of Lake Nasser which

in turn are functions of variations in the input and output of water to and from the lake.

The level of Lake Nasser reached a maximum of 178.5 m. above sea level in 1978, only 1.5 m. below its maximum level. At 180 m. any further input is deverted directly to a spillway into the desert, west of Aswan. The lake reached a minimum height of 150.5 m. in mid 1988. By October 1988 the lake level had reached 164 m. and was still rising.

A vertical fall in lake level of 6 m. between February 1982 and December 1985 resulted in a horizontal retreat of the shore-line which approached 10 km. Year to year variations in the volume of water in lake Nasser are unpredictable and thus any development scheme in Wadi Allaqi must allow for substantial change in the location of the shore-line. A permanent solution to these problems could be achieved by construction of a coffer dam well down the wadi. Water for development could then be pumped from Lake Nasser.

The variation in the level of the lake have had a profound effect on the middle part of the wadi. Following retreat from the high point of 1978, a layer of lacustrine sediments was deposited on the flat - bottomed wadi floor. These deposits, largely fine textured, provide the mineral basis for a productive soil. Beneath these lie new sub-surface water resources (6). These have combined to provide sustenance for the development of a substantial vegetation cover.

The existance of this vegetation and its development is the most compelling evidence of the new resource base of the area.

This offers a potential for development in Wadi Allaqi and at other locations around Lake Nasser. The key to development is the new sub-surface water resource which has accrued as a result of the formation of Lake Nasser.

The characteristics of sub-surface water resources in Wadi Allaqi are considered in four respects: quantity, quality, supply variability and long - term development (7).

Surface flows from the hills to the east, the former source of water in the wadi, are not entirely negligible but are so infrequent and constitute such a minor contribution to the overall water resources of the area, as to have very little impact on the overall resource pattern.

Ground water is problematic. Little is yet known about its nature, occurrence or development. Water is available in substantial quantities beneath Wadi Allaqi, but the exact size of the pool is unknown, there is a clear evidence that not only the pool is large, but also it is continuing to increase in volume.

As is indicated the old gold mines of Haimur about 15 km beyond the highest shore line of the lake, ground water exists. Here at an elevation of about 200 m water is found at depths of between 25 and 40 m in long estiblished wells. Relatively high salinity, about 4.5 parts per thousand (8) suggest that there may be a relatively high component of recent rainwater, which has acquired, soluble content during its passage to the ground water. Yet this source source must be permanent since it supplied water to the ore cruchers of the mine for a period of more than 30 years. whether or not this ground water is simply fed by infiltr-

ation from rains or by percolation from the Red Sea hills, and whether it will in future it will receive a contribution from the nile system is not known.

The evidence of greatly enhanced vegetation cover, and of water in wells point to a large scale reserve. From the examination of data, wells in the area. are shown in table 1.

TABLE 1
WELLS IN WADI ALLAQI

W E L L	Latitude	Longitude	Depth (m)
HAIMUR	22 43	33 47	--
BIR MURRA	22 32	33 55	--
BIR ABU FAS	22 09	33 48	--
BIR UNGAT	22 07	33 45	--
BIR AL-QULEIB	24 07	33 40	8
BIR ENDOKAN	22 05	34 35	14
BIR EIGAT	22 10	34 55	-1
GUGHUB	22 10	34 25	13
UM QERAYAT SHAFT		water level	25
ABO SWEYEL SHAFT		water level	25

The two main tribal groups of people who inhabit the area (the Ababda and the Basharia) had sunk some of the shallow wells, though the number and pattern of the wells change rapidly to cope with the changing circumstances of the lake shore and inundation water resources. These are shallow and temporary wells containing water derived from Lake Nasser (9). The water descends quite rapidly under gravity below the well base and ultimately enters the underlying Nubian sandstone aquifer.

The average depth of these wells is 2.5 m. but the average depth of water column in the wells is only 10 cm, though those closest to the current shore line have deeper water columns. The maximum distance of water - yielding wells from the lake shore was 1.5 km, and wells at a distance of 2 km or more from the shore were dry.

Water quality is excellent. it is suitable for both drinking and irrigation purpose.

Samples taken from beneath the midle part of the exposed wadi gave salinity values below one part per thousand (10), and correspondingly low conductance values. Water feeding the underground stores beneath Allaqi comes from Lake Nasser which is itself relatively free of dissolved material.

However, water quality is fragile and in an area where summer temperatures may approach 50 C, rapid evaporation into the dry desert air presents the most serious threat of surface salination, unless great care is taken in any use. Furthermore extensive use of fertilizers could result in equally serious deterioration in water quality.

Seasonal and long-term variations of water in the wells depends on: water levels, water levels of the lake, water depth, geological conditions including rock type and structure, distance from the lake, and premeabilty and porosity of water bearing strata and deposits.

In the case of shallow wells, water is most abundant in areas where sand and gravel overlaid finer deposits. A sandy layer at a depth of about 2 metres overlaid by recent lacustrine

clays and silts is widespread in lower Wadi Allaqi up to the line of realised maximum lake shore level (179 m. contour line).

The unconsolidated nature of the materials in which the wells are cut has led to collapse in lower sections of some wells, indicating the need for lining of the well walls.

Finally the great potential of deep water in the solid rock aquifers of Nubian sandstone and other rocks requires further investigation. It has indicated that potential supplies from these sources could be as much as 60 million cubic metres per year. The ultimate fate of shallow water associated with Lake Nasser is to descend to the deeper aquifers lying between 60 m. to be at least two separate aquifers, probably interconnected and already containing very large amounts of old water to which the new resources from Lake Nasser are being constantly added. Shallow water is a potentially valuable resource because it is relatively easy to reach and it represents a new resource not included in the finite amount available through the High Dam which is controlled by international treaty. The deeper water is a very valuable resource though more difficult to utilise in Wadi Allaqi.

2-6 Plant Ecology of Wadi Allaqi

Wadi Allaqi offers total of 89 species belonging to 34 families. Table 2 shows that leguminose dominate the floristic list of the Allaqi area followed by Gramineae and Boraginaceae (11). preanimals represent 65 % of the recorded species, while annuals are 35 %. Preanimal species in the Allaqi area are: Foreskalea, Tenacissima, Morettia, Philaeana, Zilla Spinosa, Monsonia

Table (2)

Occurrence of species by family and zone in Wadi Allaqi

Family	Number of species			Occurrence of family in each zone of Wadi Allaqi		
	A	P	Total	D	M	U
Aizoaceae	1	1	2		+	
Amaranthaceae	1	1	2	+	+	
Asclepiadaceae		4	4			+
Balanitaceae		1	1			+
Boraginaceae	3	2	5	+	+	+
Capparidaceae		2	2			+
Caryophyllaceae		1	1		+	+
Chenopodiaceae		2	2		+	+
Cleomaceae		2	2		+	+
Compositae	2	2	4	+	+	+
Convolvulaceae		2	2		+	
Cruciferae	2	2	4		+	+
Cucurbitaceae		2	2	+	+	+
Cyperaceae	2		2	+		
Euphorbiaceae	2	2	4		+	+
Geraniaceae	1		1			+
Gramineae	4	6	10	+		+
Leguminosae	4	14	18	+	+	+
Liliaceae	1		1			+
Malvaceae		1	1			+
Menispermaceae		1	1	+	+	
Molluginaceae	1		1	+		
Orobanchaceae		1	1		+	+
Palmae		1	1			+
Portulacaceae	1		1	+		
Resedaceae	1	1	2			+
Rhamnaceae		1	1			+
Rutaceae		1	1		+	
Salvadoraceae		1	1			+
Scrophulariaceae	1		1			+
Solanaceae		2	2	+		+
Tamaricaceae		1	1	+		
Urticaceae		1	1		+	+
Zygophyllaceae	3	1	4		+	+
Total	30	59	89	12	17	25

D (down stream)
M (middle stream)
U (upper stream)

A (annual)
P (perennial)

nivea,and Haplophyllum tuberculatum. These species may acquire an annual growth-form under the prevailing environmental conditions of the area. They may be a response to moisture conditions.

The table shows the different vegetation of the upstream, middle and downstream zones of Wadi Allaqi. The downstream zone is strongly influenced by Lake Nasser. Inundation and lake silt deposition on the wadi bed provide conditions more suited to mesophytic growth in this part of the wadi. The vegetation is characterised by a number of more or less mesophytic species as: Pharagmites australis, Heliotropium supinum, Tamarix nilotica, Glinus lotoides, Cyperus and cynodon dactylon, which form a dense plant cover.

In the middle zone (non-inundated) the deep silt contribute to the xerophytic conditions prevailing in this part of the wadi. Vegetation is sparce. The more characteristic species are the succulent shrub salsola baryosma and widley spaced Acacia ehrenbergiana trees or small shrubs. In rainy years, vegetation is enriched by annuals. A few species grow in dense populations, such as trianthema crystallina. Widespread dry remains of Salvadora persica and Tamarix indicate that wetter conditions have prevailed over the past few hundred years.

The upstream part of Wadi Allaqi is under the influence of humid conditions prevailing in the Gabel Elba mountain region. The bed of Wadi Allaqi is covered by coarse deposits, the water collected between the rocks is sufficient for perennial growth. In particular this area is rich in phanerophytec, which form an open forest in this part of Wadi Allaqi. The vegetation is more

diverse than in downstream parts of the wadi. Balanites aegyptica, Acacia raddiana, Salvadora persica, Leptadenia pyrotechnica, and Ochradenus baccatus are abundant phanerophytes. The ground is covered by ephemerals even in rainless seasons. Among this Shouwia thebaica forms dense patches in the bed of Wadi Allaqi.

The vegetation of Wadi Allaqi is of critical importance to the quality of life, and even the survival of its people, providing food, pasture, fuel, medicines and construction materials. The fruits, leaves, stems and grains of many plants can be eaten by people. Other plants, such as psoraled plicata and crotalaria aegyptiaca, provide grazing for sheep and goats, while Tamarix nilotica gives food for camels. Nearly every species of shrub, tree and woody perennial is used as fuel for cooking. Charcoal for sale in Aswan is made from Acacia raddiana and Acacia tortilis. These trees together with Balantis aegyptiaca and others are also used as timber. Many plants have medicinal properties (12) such as citrullus colocynthi, Cassia senna, Cleome droserifolia and Salvadora persica. Nothing that nature provides is wasted in Wadi Allaqi.

2-7 Fauna in Wadi Allaqi

In Wadi Allaqi there are about fifteen mammal species living there. They include gazelles, hyena, jackals and rodents. Most of animal species hide underground or in the shade of rock fissures and so are rarely visible.

Sixteen bird species are thought to be resident in Wadi Allaqi. The most abundant species are the larks and the white-crowned black wheatear. Ostriches are occasional seen. The wadi

is an important resting and feeding place on the migration routes of many birds (13), especially aquatic species.

Snakes are abundant and constitute a threat to human settlement. Many varieties of scorpion have been identified, as well as camel spiders which resemble scorpions but are less dangerous.

The region is characterised by a number of interesting invertebrates which mostly live under shrubs to avoid excessive heat and drought. They are small-sized, mostly ants and beetles, and play an important role in ecological equilibrium and biological soil fertility. It may be possible to use them for the decomposition of organic matter and to reduce dependence on chemical fertilisers which are expensive and could have a harmful effect on the invironment.

2-8 The People of Wadi Allaqi

A) The ethnic groups

The founder of the Ababda group is Omran Ibn Yehya ibn Abad who lived most of his life and died in Wadi Abad east of Edfu. Omran had four sons (Abd Allah, Abd el Aal, Abood and Obed Allah) who are the main Ababda sub-groups which dominate the social structure of the present Ababda through their sons (14).

Each of the Ababda sub-groups are themselves split into clans (table 3). El-Fokara and El-Malakab sub-groups are 22 clans, the El-Aboodeen and El-Shanateer sub-groups have 15 clans. While the El-Ashebab has 17 clans. The El-Gamiliah sub-group appears to be far less fragmented because it is the first urban group who moved in significant numbers out of the desert at the

end of the nineteenth and the early twentieth centuries to the towns of Armant, Qous, Luxor and Qena and towards sudan border. Large numbers, especially from the El-Aboodeen, El-Shanateer, El-Fokara and El-Malakab sub-groups have also left the Eastern Desert to migrate to the Nile valley towns of Edfu, Daraw, Qena, Luxor and Aswan, as well as to the counrtyside surrounding these towns.

TABLE 3
ABABDA SUB-GROUPS IN WADI ALLAQI

OMRAN SONS	SUB-GROUP NAMES	EL-ASHEBAB CLANS IN WADI ALLAQI	
		CLAN	HEAD
ABD ALLAH	EL-FOKARA	SADANAB	ALI SALEH
	EL-MALAKAB	HAMADAB	ALI SULEIMAN
ABD EL AAL	EL-GAMILIAH	FASHEKAB	JAR EL NABI
ABOOD	EL-ABOODEEN	DENANAB	ALI SALEH
	EL-SHANATEER	ABDENAB	OMAR ABADI
OBED ALLAH	EL-ASHEBAB	OMRANAB	

The most important sub-group in Wadi Allaqi is El-Ashebab, a sub-group which has also experienced migration of its members out of the desert, but to a far lesser degree than the other sub-groups. Six clans (Sadanab, Hamadab, Fashekab, Dedanab, Omranab, and Abdenab)of its 17 main clans are represented in Wadi Allaqi(15).

Although the Sadenab clan appears to be numerically dominant in Wadi Allaqi at the moment, Jar el Nabi (Fashekab) and Ali Suleiman (Hamadab) are arguably in that order. Jar el Nabi's pre-eminent political position is due to the following factors:

a) He is the oldest man in Wadi Allaqi, and consequently, he is accorded wisdom and authority through this.

b) Jar el Nabi and his family are the longest residents of Wadi Allaqi among the present population. Their presence in the wadi long predates inundation by Lake Nasser and the fact that he and his family lived among the pre-inundation Nubian population reinforces his position.

c) Jar el Nabi's relationships with the dabuka (camel trains) which come through Wadi Allaqi on their way from Sudan to Daraw, have been economically beneficial, so his family is the richest in Wadi Allaqi.

In addition to the six Ashebab clans in Wadi Allaqi, there has setted a second ethnic group, the Bisharia (16) who came from the Gabel Elba region and the Red Sea Hills of Sudan. They were seen as guests in the area and have been allocated a small area of land in the wadi south of Pharoahonic Rock.

As the Ababda, the Besharia ethnic group comprises a number of sub-groups of these, the El-Omrar and the El-Amandoh are currently living in north-eastern Sudan, while the Um Nagi and El-Mallak sub-groups are in the Eastern Desert of Egypt. It is a member of the El-Mallak sub-group who are currently resident in Wadi Allaqi, many of them having arrived only since the mid of the 1970's.

Any disputes which occur for land or any other thing are resolved by the Ababda clan heads in Wadi Allaqi. If no resolution can be acheived her, the case is taken to Ababda leaders in Aswan, Daraw or Edfu.

The Ababda are represented formally at Aswan Governorate level, formerly the Red Sea Governorate, but now Aswan

Governorate for Wadi Allaqi.

B) Distribution of people in Wadi Allaqi

Out of the total poplulation of the Eastern Desert located within Red Sea province, about 15500 inhabitants were accounted in 1986. In Wadi Allaqi (17) about 1.4 % of the total shown in table 4 .

TABLE 4
Distribution of People in the Eastern Desert (Red Sea Province) 1 9 8 6

LOCATION	MALES	FEMALES	TOTAL	%
EL-SHALATEEN	1369	1102	2471	15.9
WADI KHIRATE	1367	1306	2673	17.2
WADI ABADI (EDFU)	293	293	586	3.7
ABU GHOSOON	301	244	545	3.5
WADI ALLAQI	97	121	218	1.4
HAMATA & BERNEES	614	520	1134	7.3
UM EL-HOWAYFAT	2449	2186	4635	29.9
EL-SHAZLI	254	281	535	3.4
OTHER LOCATIONS			2760	17.7
T O T A L			15557	100

Source: Central Authority for Statistics, Cairo, 1987.

Within Wadi Allaqi, table 5 shows a breakdown of the population by clan. About 90 % of Wadi Allaqi's population were of Ababda, of which the Sadenab clan (Ali Saleh) represents about one quarter of the population. Basharia (the Al-Mallak clan) accounted about 10 %.

TABLE 5
The population of Wadi Allaqi by clan 1986

C L A N	FAMILIES	MALES	FEMALES	TOTAl	%
SADENAB	17	26	27	53	21.3
HAMADAB	19	20	22	42	19.3
FASHEKAB	7	15	20	35	16.0
OMARANAB	14	17	25	42	19.3
DEDANAB	2	5	8	13	6.0
AL-MALLAK	10	10	13	23	10.5
ABDNAB	2	4	6	10	4.6
T O T A L	71	94	121	218	100.0

Since April 1989, a monthly population census has taken place in Wadi Allaqi, with figures available up to March 1991. Three main comments can be made on these data as follows:

A) The mean monthly population figure over this period was 190 persons (18), less than the official 1986 census figure of 218.

B) The proportion of Bisharia among Wadi Allaqi population would appear to have increased since 1986. They varied between 45 and 90 people, while there were 23 persons in 1986. The extremely low figure for Bisharia inMarch 1991 is due to the temporarily movement of the whole Al-Mallak community some 25 km, to the north to Tougoumi, a tributary wadi of Wadi Allaqi, in search of water and grazing for their livestock, and to return later to the area around Pharoanic Rock.

C) There is considerable variation between certain months during the year. The minimum population recorded was only 140 in

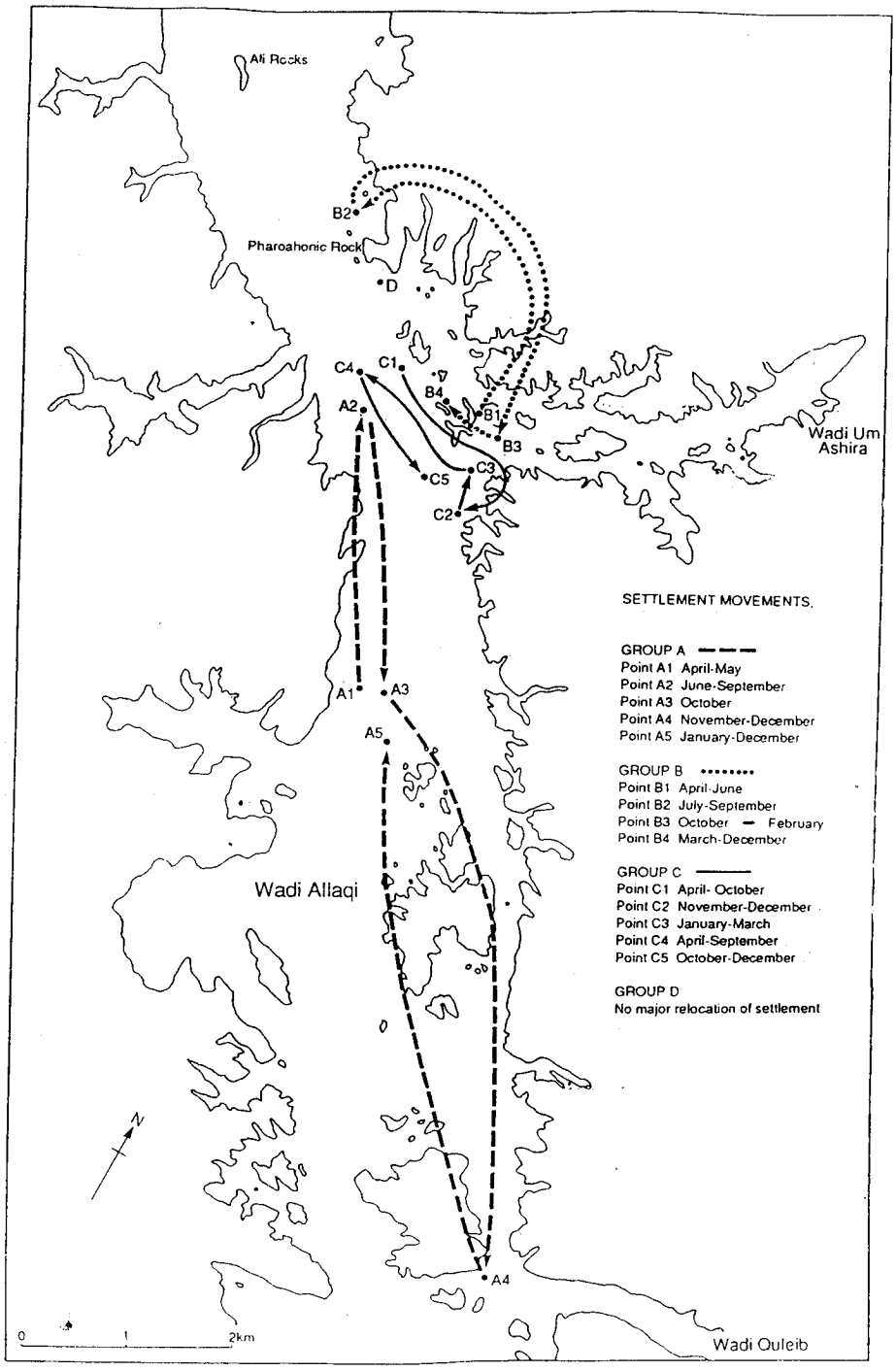
September and October of 1989, where as a maximum of 239 occurred in November 1990, an increase of about 70 % within on year.

The growth of population is due to the containing importance of the desert beyond Wadi Allaqi for economic activity and a livelihood. and hence the maintenance of a semi - nomadic livelihood system for the inhabitants of Wadi Allaqi. The People of Wadi Allaqi do not consider themselves as fully settled.

The movements of population are not only between Wadi Allaqi and the desert area of haimur, Ungat and beyond, but there are also movements taking place within the wadi itself on a local scale, but entailing the re-location of settlements and cultivatted plots (19) as shown in map 4.

From April 1989 until December 1990, only one settlement group (Group D) remanied in the same location throughout that time(map 5), that being the Bisharia, immediately to the south of Pharonic Rock. In the addition, the Bisharia farm - plots had also become relatively permanent features, they were individually surrounded by stoutly - woven tamarisk fencing, up to 1.5 metres in height and one metre in width.

The other three settlement groups displayed a relatively high degree of mobility, although only group A (Jar el Nabi) moved its settlement. A number of factors explain these movements. The most important is the relationship with changes in lake levels over the year. From September until December or January the level of Lake Nasser rises, and hence seasonal inundation of parts of Wadi Allaqi takes place, necessitating the movement of settlement to slightly higher. Immediately preceding the annual lake level rise



Map (4) Settlement movement in Wadi Allaqi

during the summer months of May to September, most of cultivation takes place. The best areas for this are those which were inundated by the previous year's flood, since, soils are fertile, and shallow grounwater associated directly with lake level shifts is available typically at depths of one to two metres.

The fact that the area has been inundated means that the tamarisk vegetation has not been able to grow in any dense, and so the land is relatively easy to clear. Even for those households. Which do not bother cultivating land, since, there is a tendency to move during the summer out into the middle of the wadi onto these seasonally-flooded lands. If indivduals choose not to move with them and remain where they were, they would be relatively isolated and would cut themselves off from immediate support systems, a crucial element of desert life.

Group A (Jar el Nabi) as well as sharing the above reasons, has one more reason peculiar to it. As Wadi Allaqi's longest resident, Jar el Nabi has established deep and trusting contracts over many years with the "Dabuka" drovers. Jar el Nabi ensures that his settlement is the most southerly in the upper wadi, so that Jar el Nabi will always be the first point of contact for the Dabuka (camel trains) after 10 - 11 days being spent crossing the desert (20).

The Dabuka is an important component of Jar el Nabi's household economy, since it provides a source of trade and exchange, a source of transport to Aswan for goods, a source of information about what is happening in the desert, and as an income for Jar el Nabi through his abilities to nurse ill camels and to find

those which have strayed from the Dabuka drovers when needed.

2-9 Settlement patterns in Wadi Allaqi

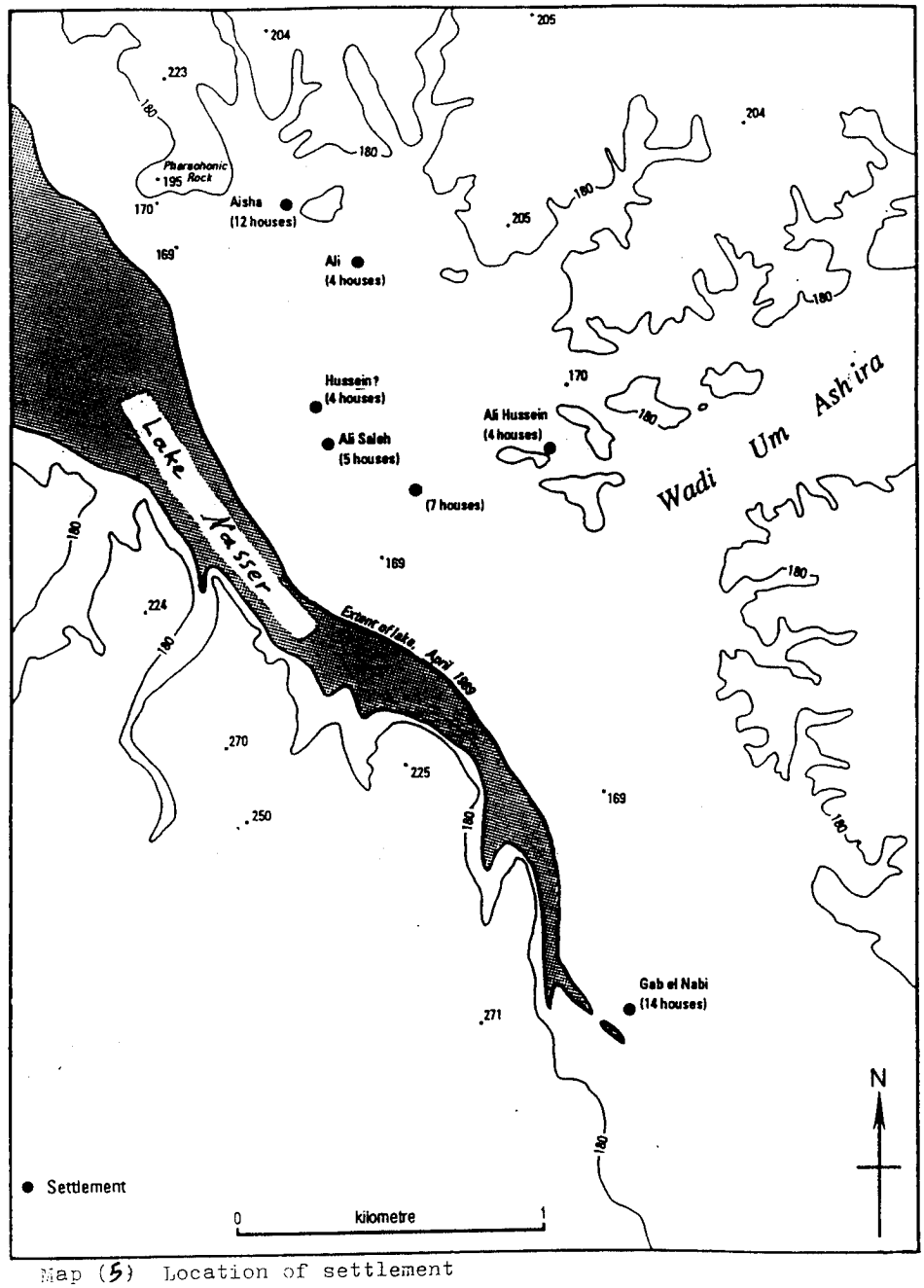
As shown in map 5 , fifty houses were counted in Wadi Allaqi, being found in seven clusters. Five stretched south - eastwards from Pharoanic Rock, spread over an area of about 1.5 km . Each of these settlements has farm - plots associated with them, and accounting for an estimated total cultivated area of 11048 sq. m, an extremly limited area. Two settlements were located away from clusters (21), one being on higher land at the mouth of Wadi Ashira (Ali Hussein), and the other about 3.5 km south-east of Pharoanic Rock (Gab el Nabi).

The movement of settlement in Wadi Allaqi appears to be quite frequent and is related directly to lake shore variations. Access to water is the critical variable, although this may be compromised in areas of dense tamarix vegetation because of the problem of scorpions, and especially snakes.

The population of Wadi Allaqi was estimatee to be about 220-250 personsin 1990. Due to the evil eye (as they beleive), lack of trust of outsiders, and the fear of desease being transmitted from outsiiders it was not possible to conduct an accurate population census.

Two measures were used. Firstly, based on calculating 4 to 5 persons using each house to sleep in, and 50 houses being counted, this gives a population estimate of between 200 and 250 persons.

The second measure was obtained from Aswan Social Department.



Map (5) Location of settlement

who were delevering free blankets to all permanent or semi - permanent residents in Wadi Allaqi. Their figures showed that there were 191 persons in the area (113 females and 78 males), but this excluded Gab El-Nabi's household. With an estimate of 25 -30 extra persons, this again leads to a figure of about 220 persons in the area. These persons are related to two main ethnic groups: the Bisharia (about 40 %) and the Ababda (about 60 %). In addition, there are two further temporary groups, approximately 100 fishermen from Kom Ombo and beyond, to the north of Aswan, who depend on fishing in Lake Nasser, and anther 100 workers came to produce marble and granite in the Haimur district, about 30 km south-east of the Pharoanic Rock.

3) HUMAN ACTIVITY IN WADI ALLAQI

There is a well-defined division of labour among households in Wadi Allaqi. No tasks are shared between men and women at all, and only the herding of sheep and goats within Wadi Allaqi is a shared task between women and children. Apart from these two tasks, all other women's duties are related to important domestic tasks, although collecting drinking - water and cutting fire wood are male tasks.

Practically, all economic tasks lie within the domain of men in Wadi Allaqi as shown in table 6. We can learn from the table that within house - tasks are undertaken by women, while tasks outside the immediate home, most are undertaken by men.

TABLE 6
The division of labour in Wadi Allaqi

ACTIVITY	MEN	WOMEN	CHILDREN
HERDING CAMELS	X		
HERDING SHEEP & GOATS		X	X
PRODUCING CHARCOAL	X		
COLLECTING MEDICINAL PLANTS	X		
CULTIVATING LAND	X		
MEETING DABUKA	X		
COLLECTING DRINKING - WATER	X		
COOKING		X	
LOOKING AFTER CHILDREN		X	
CUTTING FIRE WOOD	X		
MAKING HOUSES		X	
MAKING CLOTHES		X	
DIGGING WELLS	X		
TAKING ECONOMIC DECISION	X		

The livelihood system of Wadi Allaqi is divided into three main activities: livestock-herding, producing and trading in charcoal and medicinal plants, and cultivation.

3-1 Livestock - herding

Livestock is central to the economy of households in Wadi allaqi. Every household in Wadi Allaqi posses at least some sheep and/or goats. The median number is about 30 sheep per household. There are households running flocks of more than 100 sheep or goats. Sheep and goats are kept principally for their milk

products, but for meet is relatively rare.

There is much greater differentiation between households in terms of animal ownership. While sheep and goats are universally owned, camels ownership is much rare.

Camels constitute the most valuable livestock in the area although they seem to be more socially and economically important to the Basharia than the Ababda. Most households have only 1 - 2 camels and these are kept essentially as a mean of transport rather than a source of food. This in fact is critical as those households with a camel have greater flexibilty in arranging trips to Aswan to sell charcoal. Those households without such transport are totally dependent on camel owners for such transport, and there is a little dout that this places them at a considerable economic disadvantage within the Allaqi socio - economic system.

Grazing pressure in Wadi Allaqi is not a problem, even though there is no established management system on the floor of the wadi. This is due to the total number of livestock owned by Wadi Allaqi residents which is still relatively small, also to the annual changes in water levels, both surface and sub-surface which insure vegetation for grazing at least under present grazing demands, and to the maintenance of a trasnhumance system reduces pressures on the wadi's grazing resources.

The agricultural calendar shows that livestock principally sheep are taken from Wadi Allaqi in the winter months for grazing on the hill areas to the east and south. Hence, large numbers of sheep are found in Wadi Allaqi only in the summer months, between

April till November. For many Allaqi residents, winter movement gives the oppertunity to return to areas previously inhabited by them before coming to settle in Wadi Allaqi over the last years. This system has the key advantages that it gives an opportunity for vegetation in Wadi Allaqi to recover as well as maximising the availability of vegetation, especially grasses, in the hills, produced as a result of the winter rains.

The problem is aggraveted by the nature of the livestock grazing preferences. Preffered grazing species are: grasses which have short-lived occurrence immediately after rain or inundation, various legumes, new Tamarix growth, either very young shoots emerging immediately after flood retreat or the new plant, both of which are green and less salty than older Tamarix growth, and older, established Tamarix growth.

Camels are allowed to roam freely. It is common for camels to wander off in groups into the desert areas of Ungat, Haimur and well into the Red Sea Hills, sometimes, it is claimed, for periods as long as six years.

The camels bear a brand (washm) to signify ownership and any foals born in the desert are branded in the same way as the mother by any passing nomads (22). This degree of trust is a vital componant in the working of the socio-economic system of Wadi Allaqi and the desert beyond. If camels are needed by the owner during their absence in the desert, the owner will travel to collect them. A combination of intimate knowledge of the desert and the information which exists in the nomad community ensures, that most camels are tracked down within 3-4 days.

Most of this information is known in Wadi Allaqi by "Dabuka" from Abu Hamed in Sudan northwards through Wadi Gabgaba (Map 7), a distance of about 300 km.This usually takes between 10-11 days, during that time, the camel have lettle or no access to water or grazing. Hence, Wadi Allaqi is critical stopping-point on route, at which camels can take both water and grazing. After a night of stopping, it takes another three to four days to Aswan and Daraw where they are sold. A typical "Dabuka" comprises between 100 to 200 camels, and it is estimated that about 100000 camels per annum come through Allaqi on this route, the majority is during the winter months.

During winter months, it is not uncommon for camels and especially sheep and goats to be taken out of Wadi Allaqi to areas such as Haimur, Wadi Queleb, Wadi Neguib and Ungat to make use of reasonally available in response to occasional storms and flash-floods. The number of people engaged in this transhumance varies, depending on the number of livestock being taken and the likely length of absence from Wadi Allaqi.

The more favourable environmental circumstances of Wadi Allaqi have reduced the attractions of the hills, and it appears to be becoming more difficult to get volunteers to take the sheep. Herders are now taking it in turn to undertake this activity, and flock amalgamation is becoming increasingly common as a means of reducing manpower demends. If this trend is to continue, the economic and ecological consequences of overgrazing by livestock in Wadi Allaqi are likely to become increasingly severe, unless a form of management system is put in place.

In the absence of a management control system, the maintenance of a livestock transhumance system would appear to be crucial to the ecological and economic future of Wadi Allaqi, under existing conditions.

3-2 Charcoal production

Charcoal production is an important source of cash income for most households in Wadi Allaqi. It is predominatly a winter activity. Charcoal is produced in relatively small quentities and acacia is the preferred tree species. Charcoal is very much a complementary activity to sheep and goat herding, especially in Haimur, Um Qareiyat and Ungat, where grazing can take place in winter months, the time at which charcoal production can also take place.

Some households in Wadi Allaqi consider charcoal production to be too hard work for the returns gained, while others see their charcoal production as their main activity.

Charcoal production is expensive of labour, and especially so in the circumstances of Allaqi economy, where that labour is lost to production in the Wadi Allaqi itself for three to four winter months. It would appear that the minimum size of an efficient charcoal production unit is three persons. This is not only for company safety in a harsh and difficult environment, but also so that one member of the unit can travel back to Allaqi every three weeks to deliver sacks of charcoal to the family settlement and pick up extra food supplies. In addition, an eye still has to be kept on the well-being of the sheep flock. for some households, this level of input is more than it can meet

under present conditions.

The favoured areas for charcoal as said are Ungat, Um Qareiyat and Haimur. This is due to the best available stock of Acacia, the preferred species for charcoaling.

During the winter season, an expected production rate is five sacks of charcoal per person month in Haimur, although slightly lower elsewhere, because of the more scattered distibution of the Acacia vegetation. Tree stock is not yet being degraded and consequently does not have to be replaced, with all the implications this has for periods of economic inactivity.

Transport from the producing areas to the settled household in Wadi Allaqi is provided by camel, and is part of the transport requirement needed in support of grazing activities. Trnsport from Wadi Allaqi to Aswan is normally by the cars of Marnite company, or to sell charcoal directly to the drivers. Dabuka continues an occasional transport alternative, although the price received by producers is usually a little lower. Some time the producer takes his production himself by household camels to Aswan to sell charcoal, and to buy supplies of tea, coffee, sugar and flour. Indeed transport problems create a bottleneck to economic activity in the area in general.

3-3 Cultivation

There is no doubt that the soils of Wadi Allaqi are highly fertile, and this combined with the available water and high temperatures make this a highly productive agricultural environment at least in the short time.

Allaqi residents have learned the potential of particular

soil types within the wadi. More recently inundated areas benifit from increased silt cover, as does the channel which meanders over the wadi floor, bringing sedements from the hills to the east and south when flash-floods occur. Some consider this source to be a better provider of fertile soils than the lake. Similarly, the areas at the foot of Wadi Um Ashira and Wadi Quleib have better quality soils than elsewhere. This is not only due to the availability of high-qulity silts washed down the Wadi on an frequent basis (23), but also the flushing out of existing salts in the soil when flash-floods take place. The foot of Wadi Quleib is seen to benefit to a great extent from this, and this was the main reason why one cultivator chose to establish a plot at the foot of Wadi Quleib in 1989.

Dense Tamarix cover, especially where leaf-drop is quite prolific, is perceived to produce poor quality soils for cultivation, mainly because of the high salt content associated with Tamarix. Some of the residents perceive the Tamarix to be a key element in explaining the brackishness of well-water. Soils with a reddish tinge to them are reckoned to have high salt contents, and so to be of dubious value for agriculture .

Clayey soils are much preferred to gravelly, hence reinforcing location decisions towards the lake shore, the flash-flood channel and the foot of Wadi Um Ashira and Quleib.

Cultivation in Wadi Allaqi is a summer activity, coinciding with increased population numbers in the wadi at that time of the year, and also having a complementary relationship with transhumance in the winter. Both activities are the preserve of

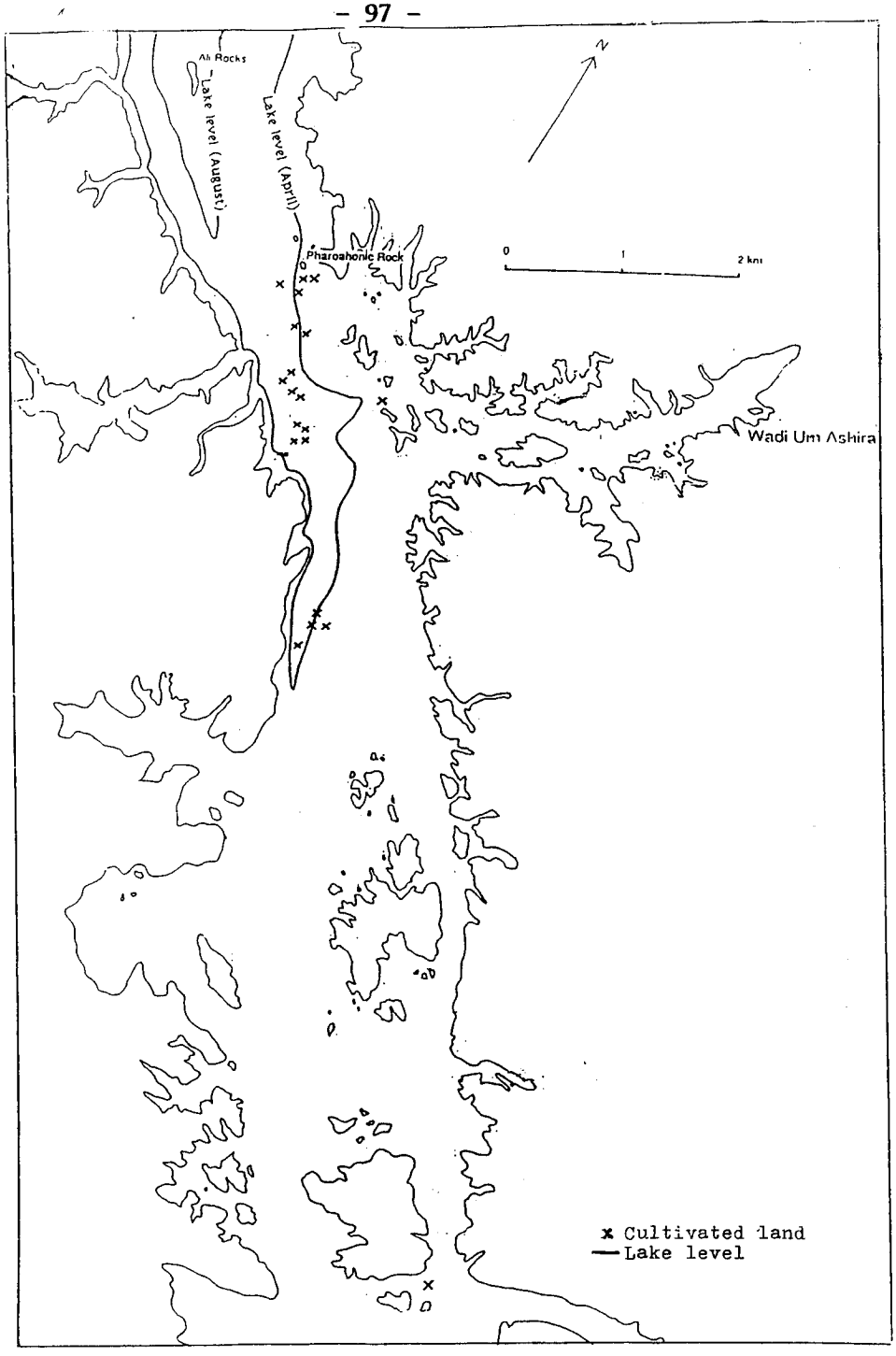
males, so that labour allocation choices have to be made. Standards of land husbandry are quite high, with most plots being watered daily, weeding being seen to be important, bunds and feeder channels being important to keep out even the most determined camels, and bird-scarers being widely used.

The amount land under cultivation in Wadi Allaqi is very limited table 7, although there is a feeling among the majority of those interviewed that this area is likely to expand, as confidence increases through increased settlement stability and continuing success in production. The area cultivated (map 6) was about 1450 m in 1990 compared with 10640 m in the year before, this is due to the shortage of labour and the varying level of Lake Nasser, on which the distribution of cultivated land in Wadi Allaqi depends.

TABLE 7
Cultivated land in Wadi Allaqi
1 9 8 9 - 1 9 9 0

I T E M	1989	1990
TOTAL AREA CULTIVATED	10640 m	1450 m
MEAN PLOT SIZE	1064 m	73 m
MEDIAN PLOT SIZE	225 m	50 m
MAXIMUM PLOT SIZE	1065 m	225 m
ACTIVE WELLS	14	21
NUMBERS OF PLOTS	10	8
NUMBER OF CROPS	8	12

Normally, the first planting took place in March, as land



Map (6) The lake level and cultivated land in Wadi Allaqi

became clear from water inundation. With the exception of a small tree plot established at the foot of Wadi Quleib, all plots are established in close proximity to the water level at that time of year.

The choice of plot location in the wadi is influenced by the location of surface lake-water and the depth below the surface of well-water, also by soil quality.

As soon as the location is already chosen, the most time consuming task is the preparation of protective fence to protect the plot from grazing animals. The plot must be surrounded by about one metre high fence comprising materials such as acacia and especially Tamarix wood and branches. In some cases, old fishing nets are used. Each plot usually has at least one well. The usual depth of the wells is between one to two metres.

Irrigation is carried out simply by a bucket and rope, and water is pourred into a preorganised system of surface feeder channels. The method needs labour and time consuming. So, these are problems stand against the expansion of land under cultivation.

Table 8 Summarises the crops which are grown in Wadi Allaqi. Most of these crops are grown for household consuption. Maize is grown as animal feed in about 75 % of the plots.

TABLE 8
The crops in Wadi Allaqi

1989		1990	
Crop	% of the plots	Crop	% of the plots
WATER - MELON	80	MAIZE	75
BEANS	80	WATER - MELON	50
MAIZE	70	OKRA	15
SORGHUM	70	MARROW	15
ACASIA	70	KARKADEH	10
OKRA	60	WHEAT	10
ONION	20	CITRILLUS	10
SAGIRH	10	ACASIA	10
		LEMONE	5
		BEANS	5
		CUCUMBER	5
		MILLET	5

It is clear that the cultivated lands provide only a fraction of household dietary requirements at the moment. Grain crops which are important are used mainly as animal feed. Most of the people of Wadi Allaqi expand their areas of cultivation, but primarily to satisfy household consumption demands, rather than to generate a cash income. Some resistance was met to cash production some reasons such as difficulties of transportation to Aswan, low prices in Aswan, water problems, and weather.

Also, some medicinal herbs grow wild in and around Wadi Allaqi. Some of these can fetch premium prices in Aswan.

3-4 Dabuka transits

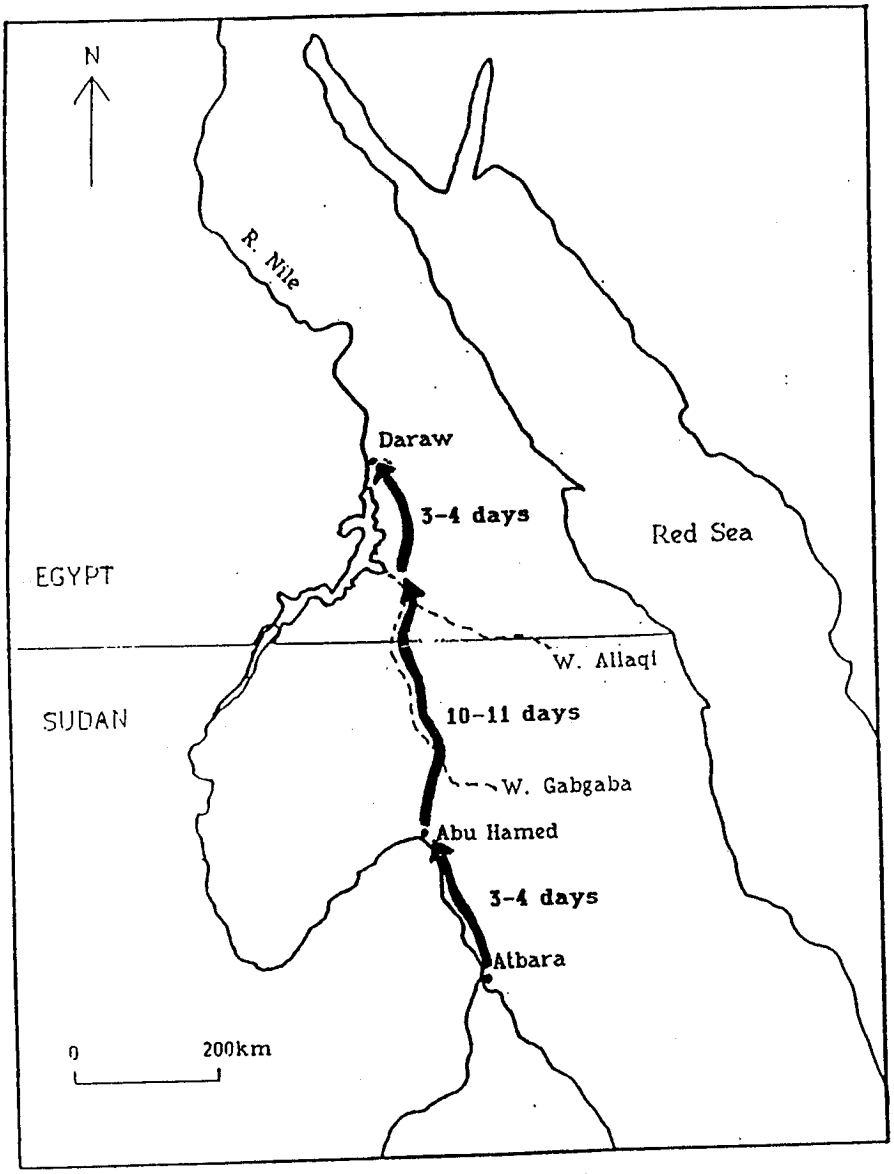
Wadi Allaqi has an important role for Dabuka (camel trains) as a major stopping-point for Dabuka from Sudan. Normally the camels are collected in Abu Hamed and Atbara before setting off on a journey of 10-11 days (25) northwards across the desert, following Wadi Gabgaba for much of the way, to Wadi Allaqi (Map 7). The final stop ends in Daraw, north of Aswan, where there exists a major camel market.

Wadi Allaqi (because of the presence of an arm of Lake Nasser extending into it) fulfills a major role in this system.

Although healthy camels can survive for up to 14-15 days without water or food, the journy from Abu Hamed to Wadi Allaqi (10-11 days) sometimes presents few problems. The available water in Wadi Allaqi which is vitally important for the maintenance of camel, and thus meat quality.

Normally, the drovers make a stop of few hours for water as a vital element in the system, but camels are not permitted to drink too much water, as this makes them sluggish, performing badly on the remaining three to four days up to Daraw. Also, excessive consumption of Tamarix leaves is discouraged, as its salty nature raises thirst levels that leading to excessive water consumption by the camels.

It is estimated that about 100000 camels per year make the journy from Sudan by this route, with a typical Dabuka size of 300 to 400 camels in charge of three to four drovers to look after a Dabuka of this size. It is clear that the Dabuka have a significant impact on and relationship with Wadi Allaqi and its



Map (7) Dabuka route (camel trains)

residents, since it is organized in about 300 Dabuka per year resulting a considerable activity in Wadi Allaqi, with both ecological and socio-economic implications, especially during winter months. At that time, overgrazing by Dabuka is not a problem, because of the limited time which is spent there, as well as the active discouragement by drovers of Tamarix grazing.

Economically, Dabuka drovers provide a source of trade, and also means of transport to Aswan and Daraw for Allaqi residents, though the presence of Marnite company has weakened this relationship in the last years.

The drovers also provide information on the desert areas through which they have travelled. This is critical for example in informing Wadi Allaqi residents about the location of recent rainfall and grazing in the desert, identifying ownership from the face-brands put on the animals. Since, the Dabuka have no time to stop attend to newly-born camels, or lame or ile beasts, information about the location of any left behind is given to Allaqi people. If the animal is saved, it becomes the property of the saver. If the problem of transport can find a solution by better roads and means of transport, it will be possible for Wadi Allaqi to be an important market as Daraw, since it will save time (3-4 days) between Wadi Allaqi and Daraw.

Conclusion

What is known about Lake Nasser and the area around,it is of great importance. Wadi Allaqi can share successfully in the national income, since this area is rich in mineral resources and plant ecology, if these are wisely used, following a well organised policy. To expand knowledge about Wadi Allaqi is needed to any development program.

From the study we conclud the following:

1) Lake Nasser has a great influence on Wadi Allaqi.

2) The level of Lake Nasser varies over both seasonal and yearly due to inflows to and out flows from the reservoir.It results in considerable variations in the location of the shore line at any point, and have a major influence for hidrology.

3) Cultivation, especially the way in which it is organised in relation to the lake level changes, is a new activity for the majority of Allaqi residents. The experience of most residents dates back to ten years, and even during this period, much of it has been tentative and all too frequent, less than successful.

4) Livestock is central to the economy of households in Wadi Allaqi, since grazing pressure is not a problem, due to the annual changes in water levels which ensure vegetation for grazing.

5) The geology of Wadi Allaqi provides a good base of mineral resources as:gold, copper, chromite, uranium, talc, graphite, marble and granite. It needs attention to have the best results of it.

6) There are 89 species of plants belonging to 34 families in Wadi Allaqi, and about fifteen mammal species living there.

7) Transport difficulties inhibit exchange, especially with Aswan. Households depend mainly on camels. This is an inhibiting factor for market production. So, the asphalt road between Aswan and Wadi Allaqi and the means of transport using it are strongly needed.In this case,it will be possible for Wadi Allaqi to be a camel market as or instead of Daraw.

8) Labour shortages, especially for irregation limits the expansion of cultivated land in Wadi Allaqi.

9) The generally poor health status of the population,undermined by shortages of food and medicine, and the difficulty of maintaining the health (and hence productivity) of livestock are one of the results.

10) Population in Wadi Allaqi itself fluctuate and reflect both changes in lake level and continuing opportunities in the surrounding desert, which still has a strong emotional and economic pull of Allaqi inhabitants. The relocation of settlement within the wadi is an important feature, and is a function of water availability and personal comfort, especially during the hot summer months.

11) Dabuka transits affect directly only a limited number of households. This component of the system may offer the most potential for economic development in Wadi Allaqi.

12) Development must be directed to the local people who provide the human resource necessary for natural resource utilisation.

13) Development proposal must be based upon a realistic evaluation of resources.

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