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Natural Resources Assessment of Wadi El-Gemal Basin, Red Sea, Egypt

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ABSTRACT

Natural resources such as water, rocks, agricultural soil, flora, and fauna are very essential for any type of development. The present study deals with the natural resources in Wadi. El Gemal Basin (WGB). To achieve this goal, geomorphology, natural hazards and natural resources are investigated. From quantitative analysis of the drainage basin, the relief features of WGB are differentiated into second and third order features. Suitability of groundwater quality for different purposes was investigated by analysis of four water samples represent the whole water wells. The results of the hydrochemical analysis showed that water types are sodium-chloride in W. El Gemal and Hofifit wells and sodium-sulphate in Hafafit and Um Ghannam wells. Water wells of Um Ghannam and W. El Gemal are suitable for drinking and domestic purposes but after conducting microbiological analyse. The soil in the flat areas within the basin is very suitable for raising crops and trees. Construction materials in the form of sand and gravels are available in WGB. Natural vegetations such as Avicennia marina, etc., are growing widely in the area. The common fauna in WGB are reptiles, birds, mammals and scorpions. As a conclusion, WGB is a convenient location for settlement and developing programs in the Red Sea.
Keywords: Groundwater, Natural hazards, Natural resources, Wadi El Gemal, Water quality.

INTRODUCTION

The lower reach of Wadi El Gemal is easily accessible through the Red Sea Highway at about 52 km south of Mersa Alam city. Wadi El Gemal is one of the main Wadis in the Eastern Desert; its basin hosts a multitude of unique and significant features of: geological, economical, archeological and environmental importance. Geological and tectonic key domains that have great significance in the tectonic evolution of the Arabian-Nubian shield include Hafafit dome and the fish-shaped body of Nugrus-Sikait area (Khaleal, 2005). Economic resources of mineral wealth include beryl deposits of Um-Kabu and Sikait occurrences. Archeological resources include Sikait Temple, Madinat Sikait, Madinat Nugrus, Madinat Um Kabu, and the remnants of the old beryl mines. Environmental resources include a wealth of desert fauna, flora, and mangrove forests at the outlet of the wadi into the Red Sea. All these qualities and other attributes qualifies Wadi El Gemal to be the best route for a new cross-desert highway from the Nile valley to the sea south of Idfu-Mersa Alam highway. This will be the best choice to serve the development of the South Eastern Desert from several points of view. The catchment areas of W. El Gemal Basin are shown in (Fig. 1). Most of the previous studies on Wadi El Gemal dealt with it as a desolate area and did not take in consideration that it would be inhabited by people. So, this environmental study would be a step in preparing the area for development.

The area is expected to be one of the most important areas in Egypt in the future because of its great and diversified potentialities. It offers the two basic pillars of development, namely agriculture at the mouth of Wadi El Gemal, together with the medicinal plants, mining of the rare metals in Nugrus-Sikait area. Water would not be a problem as will be shown below. Electricity could be obtained from wind or from the sun.

In March 2003, WGB became a desert protectorate under the name "Wadi El Gemal-Hamata protectorate" with an area of 7450 km^2. It is vital to study the environment of this area as a fundamental factor in development.

However, great considerations must be given to potential hazards, particularly flash flood hazards that seem getting more frequent in the last few years as a result of weather changes in Egypt. The present study will discuss and present some of these important results as an example of the good management of natural resources in arid regions.

Geological Setting

A regional geologic map of the study area is shown in figure (2). El Ramly *et al.* (1993) concluded that the node units in the area, based on metamorphic grade and complexity of deformation are divided into two major groups separated by a low angle thrust and intruded by the late granitoids. The structurally lower group comprises the Migif-Hafafit gneisses and associated rocks.

This group is characterized by medium grade metamorphism and complex deformation. The second group, known here as Ghadir group, tectonically overlies the first group and is characterized by relatively low metamorphic grade and simpler deformation (El Bayoumi, 1984). The two groups are separated by a major thrust, known as the Nugrus thrust, which runs along the upper part of Wadi Sikait in a NW direction.

An important aspect of the geological setting of Hafafit Nugrus area is the occurrence of the huge granitic

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batholiths of Wadi El Gemal, and its off-shoots, which appear in the domal structures of Wadi Hafafit Culmination (WHC) and other domal structures outside WHC, like that of Umm El Kheran (Hassan and Hashad, 1991). It is believed that the various mineralization occurring in the larger Wadi El Gemal area is somehow related to this granitic batholith, e.g. beryl, Nb-Ta (Hassan 1973, and Bugrov *et al.*, 1973, and Khaleal, 2005).

Geomorphology

Wadi El Gemal Basin is one of the prominent geomorphological features in the Eastern Desert of Egypt. Few geomorphological studies were carried out on Wadi El Gemal; the most important studies are Hegazy, 1984; Akawy, 1999; Ahmed, 2001; and Khaleal, 2005.

Wadi El Gemal is divided geomorphologically into three units, namely the lower reach low lands, the uplands, and the high lands. The lower reach low lands, representing the cultivable land at the outlets of the wadi towards the Red Sea, constitute the lowest relief in the area besides Wadi El Gemal tongue known as Ras Baghdadi and Gezerat Wadi El Gemal (Fig. 3). The uplands of Miocene formations show moderate relief of about 40 m above the wadi level. The highlands formed mainly of Precambrian basement rocks and represent the highest elevations in the area, constituting the upstream of WGB. Following Worcester (1948), the relief features of WGB are differentiated into second

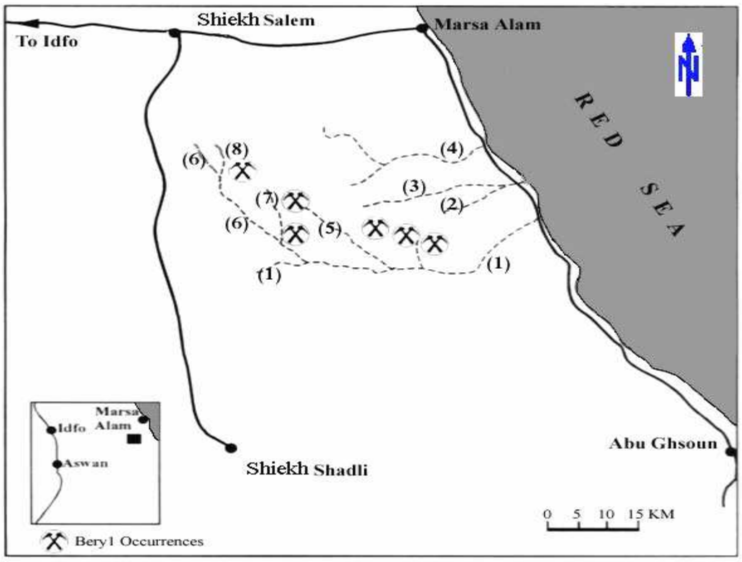

Figure (1): Key map showing the location of the study area: 1- W.El Gemal 2- W. Remarim 3- W. Ereir 4- W. Ghadir 5- Um Kabu 6- W. Nugrus 7- W. Sikait 8- W. Abu Rusheid.

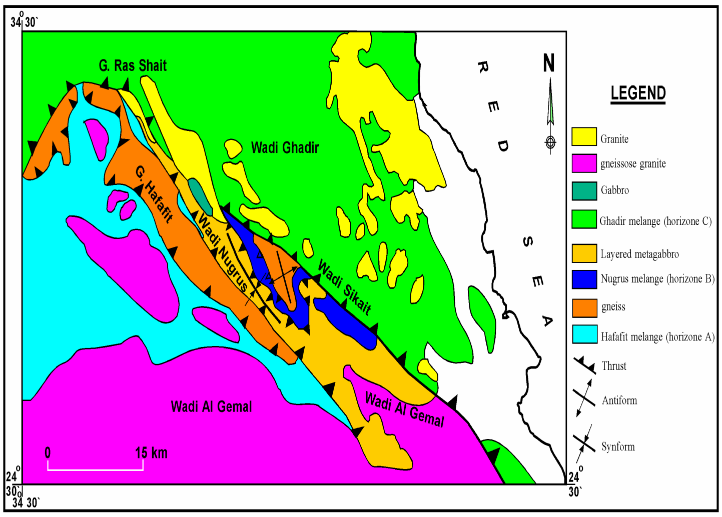

Figure (2): Geological map of study area (after El Ramly et al. 1984; Hassan 1973).

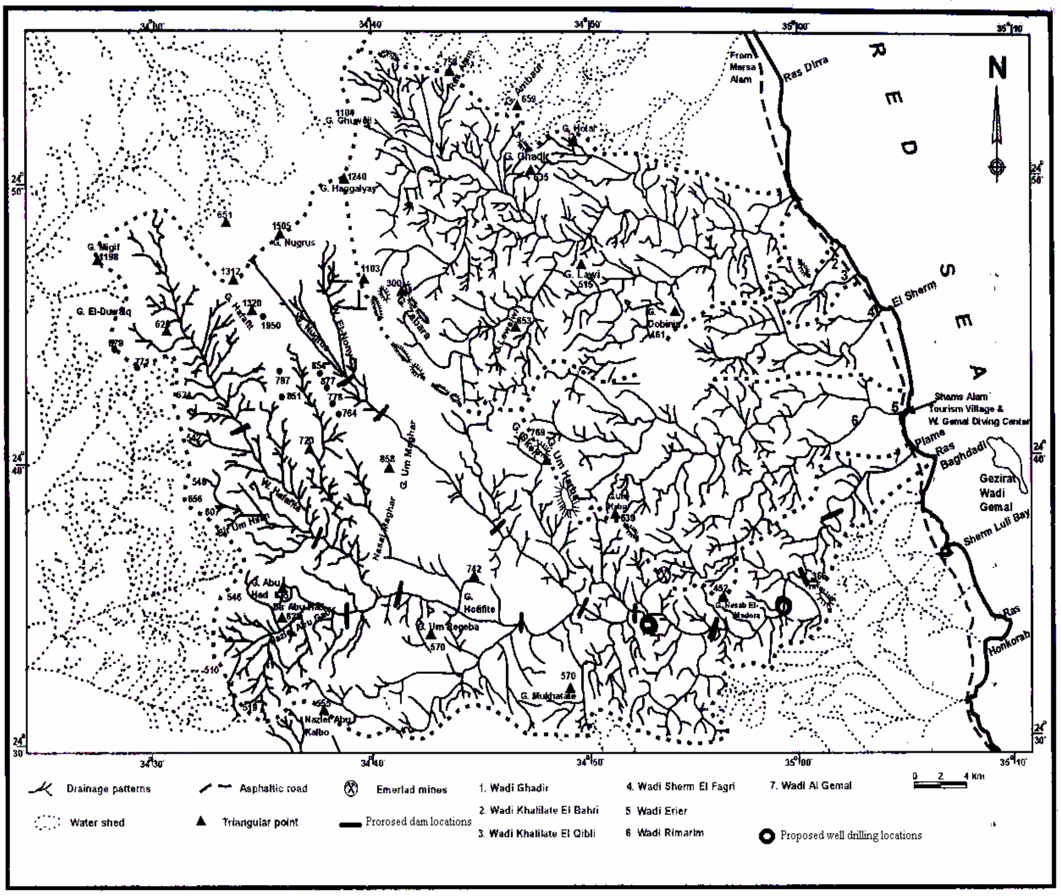

Figure (3): Geomorphologic map of the Wadi El Gemal area.

and third order features. Relief of the second order features includes mountains and plateaux. The most prominent mountains in WGB are Gabal Hafafit (1950 m asl), Gabal Nugrus (1505 m asl), and G. Sikait (796 m asl). Few plateaux of small extent are present in the study area; this is due to the resistance of the crystalline rocks against planation. The third order topographic forms, which include all the relatively minor topographic forms, are represented in Wadi El Gemal by hills, wadi terraces and valleys. Hills in WGB are classified into two main types, namely conical hills and elongated hills. Wadi terraces occur in many parts of WGB. The lower parts of these deposits are fine-grained sand and silt whereas the upper parts range in size from gravel to coarse sand. These terraces indicate that the channels were rejuvenated and terraces.

The main valley is Wadi El Gemal and its tributaries; each of them has miscellaneous tributaries. They are U-shaped in cross section while some of their tributaries are V-shaped. The slopes of the valleys are steep due to the high resistance of the wall-forming rocks. The upstream of Wadi El Gemal is located near Hafafit culmination. Ridges are well represented in WGB, especially the eastern part, which is occupied by foliated metagabbros. The general trend of these ridges is the NW-SE direction.

Climate

Three elements of climate will be evaluated for WGB, namely air temperature, relative humidity, and rain fall. Due to the lack of meteorological stations in WGB, the necessary data were collected from a simple designed meteorological station in W. Abu Rusheid. Intermittent recording of air temperature and relative humidity were carried by a handy instrument type during 2003. The average values of temperature and relative humidity during the four seasons of that year were calculated (Table 1). The amount of rainfall in the study area is affected by temperature and by the speed and direction of wind. The minimum limit of the amount of rainfall which may cause runoff and flash floods is one mm in one per minute, or a total amount of about 10 mm in one storm (Cook *et al.*, 1985). The annual rainfall quantity in WGB is 17.4 mm; while the maximum rainfall in one day was 10mm (Ahmed, 2001). According to standards set by World Meteorological Organization (1988), WGB is characterized by arid climates (< 150 mm).

Natural Resources

Water, rocks, agricultural soil, flora, and fauna represent the natural resources in WGB. These natural resources constitute vital parameters for any kind of development.

1. Water

The water resources in WGB include rainfall and groundwater. The rainfall water could be considered as an untraditional surface water resource, particularly when runoff water is conserved by natural pits (Fig. 4) or by constructing dams and reservoirs.

In arid regions, exploration for groundwater constitutes an important aspect for any kind of development, especially agricultural development. Therefore, a detailed hydrogeochemical study was done on the water of the main four wells in the study area. In WGB, the groundwater resources originate mainly from occasional rainfall, that partially infiltrate through the friable loose sediments and accumulates on basement depressions or trapped at fault plains and buried dykes. A total of four representative water samples were collected from W. El Gemal Basin (Table 2). All of these water wells are fault plain type wells, which are generally hosted by the basement rocks. All of the water samples were collected in clean 200-ml polyethylene bottles and stored in a cooler for 24 hour. The samples were analyzed for their chemical elements constituents. The analyses were carried out at the laboratories of the Nuclear Materials Authority (NMA), Cairo, Egypt.

The chemical analysis were performed for the major cations and anions (Ca^{++}, Mg^{++}, Na^{+}, K^{+}, HCO_3^{-}, CO_3^{--}, Cl^{-} and SO_4^{--}) in addition to the Total Hardness (TH). The Total Hardness was calculated as $CaCO_3$ in mg/l. according to the relation: TH = 2.5 Ca^{++} (mg/l) 4.1 Mg^{++} (mg/l) (Todd, 1985). The pH measurements of the water wells were carried out in the field as well as in the laboratory. The water samples of the major wells in the area physically and chemically were studied to determine their constituents and quality.

2. Soil for Agriculture

Soil is the material capable of supporting plant growth. Recent loose sediments are composed of sand, silt, and clay. They are deposited by the running water mainly in the flood plains and partly in the wide parts of the wadis. These sediments cover the flat areas and constitute excellent soils for raising crops and trees; in WGB Salvadora Persica islands are good examples.

3. Construction Materials

Construction materials are essential for economic development, infrastructure improvements, and growth of manufacturing sector. Sand and gravels are the available construction materials in the study area. The Pliocene gravels occur as scattered accumulations in several parts at the lower reach of WGB. These are mainly loose gravel ranging in diameter from 1 cm to 20 cm or even more. The thickness of the gravel accumulations range from 3 m to 8 m, and it is extensively quarried as building material. The largest of these accumulations occur as terraces at the lower reach of WG where they occupy lower elevations. These gravels could also be used as ornamental stones because of their roundness and highly variable colors.

Table (1): Air temperature and relative humidity (average values) during the four seasons of 2003 in Abu Rusheid Area within WGB.

Average	Autumn	Summer	Spring	Winter
Air temperature ^{0}C	20	33	19.1	19.8
Relative Humidity %	46	27	49	60

Table (2): Well location in WGB.

Well	Longitude	Latitude
W. El Gemal	34º 36/ 59//	24º 34/ 59//
Hafafit	34º 33/ 30//	24º 37/ 10//
Um Ghannam	34º 33/ 58//	24º 34/ 30//
Hofifit (near of Gabal Hofifit)	34º 45/	24º 34/

Figure (4): Water accumulating in pit on the cataclastic rocks of wadi Abu Rusheid.

RESULTS

Geomorphologic analysis of drainage net of WGB

The aim of the quantitative analysis of a drainage basin is to calculate its morphometric parameters and consequently knowing its geological and environmental significance. The drainage characteristics of WGB are given in Table (3). The drainage net is well developed, integrated, dense, and oriented, and has variable angles of juncture. Large tributaries are mostly directed NW and significantly NE. This is mostly due to fault control (Akawy, 1999). The main Wadi oriented NNW in the upper part, E-W in the middle part and ENE in the lower part. Metamorphic rocks, metasediments, and granitoids are the most widespread lithologic units exposed in the basin. Neogene and Quaternary sediments with local fans are located at the outlet of this basin (Ahmed, 2001). The lower part of the main trunk wadi has low width (1/2 km); this indicates a high potential for flood hazards at the upper reaches of the basin and the down stream part of the main trunk wadi.

The most important conclusions from the above analysis are as follows:

(1) The bifurcation ratio (3.92) indicates dangerous floods in the area (Mucullagh 1978). Dangerous floods of this basin usually bring destruction to the Red Sea asphalt road. They also produce enormous quantities of surface water runoff that unfortunately is lost to the Red Sea. Therefore, it is recommended to construct dams at the narrowest locations of W. El Gemal (Fig. 3), to save the seaward draining fresh water.

(2) The elongation ratio of the studied basin is 0.76 indicating an elongation of this basin and reflecting moderate to strong relief and moderate to steep slopes.

(3) The stream frequency of the studied basin is 2.44 indicating that this basin has low capability for collection of surface water runoff (based on Hammad *et al.*, 1994).

(4) The drainage density of the studied basin is 2.1, which is considered high according to Horton (1945). This drainage density reflects high mountainous relief, impermeable subsurface material, sparse vegetation, and small proportion of ground water contribution to the discharge (Orbson, 1970; El Rakaiby, 1990 and Hammad *et al.*, 1994).

Hydrochemical characteristics and groundwater quality evaluation

Several parameters were calculated to determine the suitability of the groundwater quality for domestic and irrigation purposes. The results of the hydrochemical analyse of the groundwater samples are listed in Table (4).

The low TDS value in Um Ghannam well might be related to the location of the well close to the recharging areas. The TDS values in Hafafit and Hofifit wells are 1476 mg/l and 2800 mg/l, respectively. Therefore, the groundwater of Hafafit well is permissible for drinking purposes but that of Hofifit well is considered unsuitable to satisfactory for these purposes according to the guidelines for water quality set by WHO (1971).

On the other hand, this water is excellent to very satisfactory for all classes of livestock and poultry (<3000 mg/l, National Academy of Science, 1972).

Concerning the suitability of the groundwater for agricultural purposes, the groundwater of all wells does not exceed the suitable limits for irrigation water (<3000 mg/l, FAO, 1985). All the total dissolved salts in groundwater of the study area can be removed from water by distillation and deionization processes. Water hardness results from the presence of Ca^{2+} and Mg^{2+} combination with CO_3^{2-} and HCO_3. Hard water is unsuitable for household cleaning purposes. A look at Tables (4&5) indicates that the total hardness (TH) contents of W. El Gemal, Um Ghannam, and Hafafit wells are 245.1, 282.9, and 327.8, respectively, which are below the maximum permissible level of WHO (1990) for drinking water (500 mg/l). Hofifit well has a total hardness of 554.4 mg/l; this value is slightly higher than the maximum permissible level of WHO (1990).

Table (3): The estimated physiograph network parameters for WGB.

The parameter	The value
Basin area	1477 km^2
Basin length	56.3 km
Basin width	26.3 km
Basin perimeter	186
Stream order	7
Bifurcation ratio (Rb)	3.9
Stream length (Σ L)	82.6 Km
Frequency in basin (F)	2.4
Drainage density (Dd)	2.1
Valley index (VI)	1.47
Total number of streams of all orders	3598
Total length of the streams	3099
Circularity ratio	0.66
Elongation ratio	0.76
Shape factor	0.47
Relief ratio	0.026
Ruggedness number	3126
Topography ratio	63.9

Table (4): Results of the chemical analysis of groundwater in WGB (mg/l).

Parameter	W. El Gemal	Hafafit	Um Ghannam	Hofifit	Maximum permissible level WHO (1990)
PH	7.1	7.5	7	7.5	6.5 – 9.2
TDS	870	1476	650	2800	1500
Ca++	80.2	92.2	64	96	200
Mg++	30.4	28	18.7	56	150
Na+	175	333	100	731	500
K+	4	21	3	44	
Cl-	277	266	89	750	500
HCO_3-	119.6	195.2	192.8	385	500
SO_4--	160	517	167	715	400
CO_3--	14.9	12.4	7.4	17.4	
TH	245.1	327.8	282.9	554.4	500

The high TH content of the water can be attributed to the presence of calcium and bicarbonate concentrations, which affect the quality of domestic water.

The classification of Total Hardness (TH) according to Sawyer and McCarty (1967) indicates that the water of W. El Gemal and Um Ghannam wells can be classified as hard water, while the water of Hafafit and Hofifit wells can be classified as very hard water (Table 5).

Figure (5) shows water samples plots on Piper diagram and their water types based on the results of the chemical analyses. Based on the dominance ion in the groundwater samples, which is generally hosted in basement rocks, three different sequences of groundwater in the area are distinguished as follows:

(1) $Cl^{-} > SO_4^{--} > HCO_3^{-} / Na^{+} > Ca^{++} > Mg^{++}$
This sequence is recognized in W. El Gemal and Hofifit wells and pertains to ultimate stage of metasomatism in groundwater chemical type.

(2) $SO_4^{--} > Cl^{-} > HCO_3^{-} / Na^{+} > Ca^{++} > Mg^{++}$
It is found in Hafafit well and represents the intermediate phase in metasomatism in groundwater chemical type.

While in Um Ghannam well, the following sequence has been found:

(3) $SO_4^{--} > HCO_3^{-} > Cl^{-} / Na^{+} > Ca^{++} > Mg^{++}$
Accordingly, the groundwater chemical types are sodium-chloride in W. El Gemal and Hofifit wells and sodium-sulphate in Hafafit and Um Ghannam wells (Fig. 5).

In addition to the above mentioned resources of water in WGB (rainfall and groundwater), Red Sea water is considered as an important resource from two point of view; the first is the desalination and the second is seawater agriculture. Edward *et al.* (1998) defined the seawater agriculture as growing salt-tolerant crops on land using water pumped from the ocean for irrigation. They (Op. Cit) domesticated wild, salt-tolerant plants, called halophytes from grasses (such as Distichlis) and shrubs (such as Salicornia) and Atriplex to trees (such as mangroves), for uses as food, forage, and oilseed crops.

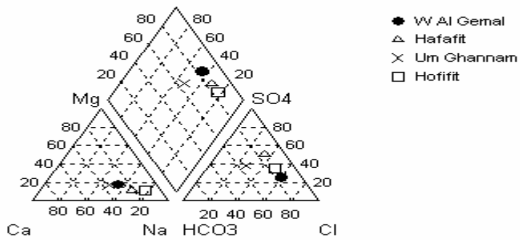

Figure (5): Trilinear Piper diagram of water chemistry in the study area.

Flora

WGB is characterized by arid conditions with long rainless seasons. High temperature and high atmospheric humidity prevail. Under such conditions, plant life is confined to the wadis where runoff water is collected and stored in wadi-fill sediments. These plants are called natural vegetation. The most common flora in WGB are *Avicennia marina* (Mangrove), which grows near the coast, Pheonix dactylifera, which grows only near the beach, *Tamarix* sp., that grows along the 15th km at the lower reach (Fig. 6A), *Salvadora Persica*, that grows as isolated islands along the wadi (Fig. 6B). It is also used as a medicine particularly for mashing kidney stones (a special comment from Ababda people). *Balanites aegyptiaca*, grows in considerable amounts along the wadi (Fig. 6C). It is used as a medication for diabetes. Acacia sp. grows also along the wadi (Fig. 6D), Solenostemma argel grows widely at W. Nugrus; it is used as a medication for abdomen pain.

Fauna

Fauna in WGB include reptiles, scorpions, birds and mammals. At least twenty one species of reptiles have been recorded from the mountains of the Eastern Desert (Kassas and Zahran, 1967 & 1971). The common reptiles that were seen in WGB are *Cerastes cerastes*, *Naja nigricollus nigricollus* (Spitting Cobra, adults, average 1 m to 1.2 m in length), and *Telescopus dhara obtusus*, (adults average 40 cm to 70 cm). Cerastes is one of the adders (Fig. 6E); its venom is responsible for the destruction of blood vessels and tissue. This species inhabits dry sandy regions where it sidewinds on soft sand. It often buries itself in loose sand by shuffling motion. Only the top of the head, eyes, and "horns" are left exposed. This habit serves at least two functions; first, the snake can await its prey in well concealed ambush, and second, it assists in temperature regulation in an arid environment.

Scorpions are most famous because of their venomous sting, which in some species is lethal to human especially children and old men. *Compsobuthus werneri* (Fig. 6F) is found in WGB; it has a yellow color and does not have black segment on its metasoma. Scorpions use venom for immobilization of prey and protection against predators. The toxins of scorpions were described in details by Kopeyan *et al.* (1974), Grishin (1981) and Possani *et al.* (1982). Dabb (Fig. 6G) is also present, especially in Wadi Nugrus.

At least twenty eight bird species are known to regularly breed in the mountains of the Eastern Desert (Goodman *et al.*, 1989). Migrant birds pass through the mountains and Wadis of the Eastern Desert, particularly during autumn. The vegetated parts of WGB, especially near the coast, play an important role in providing resting areas for small passing arctic migrant birds. The most common birds in WGB are Raven, Pigeon, and Isabelline Whe. (Fig. 6H). Twenty nine species of mammals have been recorded in the Eastern Desert (Osborn and Hilmy 1980). The most common in WGB are camels, sheeps, goats, *Gazella dorcas* (Fig. 6I), *Capra ibex nubiana, Lepus Capensis, Vulpes rueppelli* and *Acomys cahirinus*.

DISCUSSION

Geomorphology, climatology, natural hazards, and natural resources were investigated in W. El Gemal Basin (WGB), Red Sea area. Based on the results of the quantitative analysis of the obtained data, WGB is characterized by suitable relief and climate, and by the presence of natural resources such as water, agricultural soil, construction materials, fauna, and flora. The results

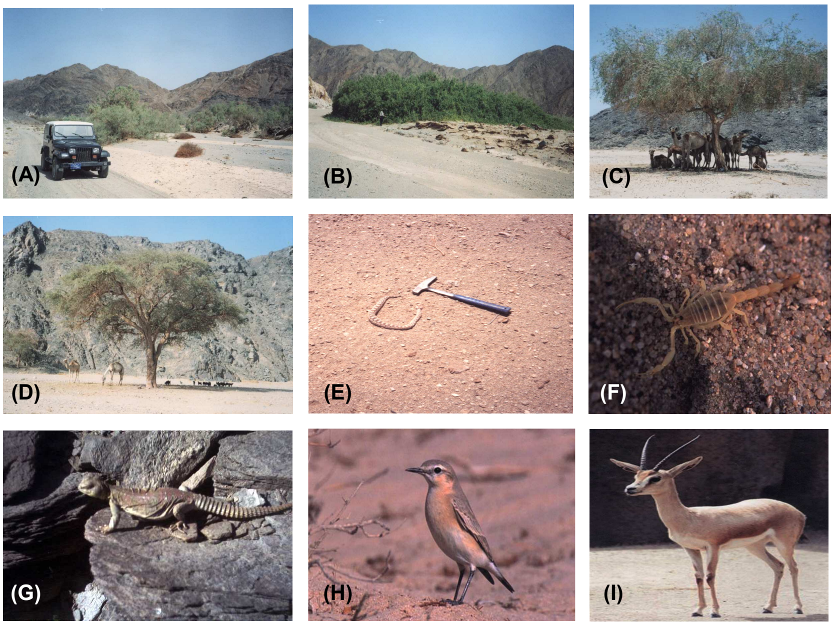

Figure (6): **(A)** *Tamarix* sp., **(B)** *Salvadora Persica* island, **(C)** *Balanitus aegyptiaca*, **(D)** *Acacia* tree at W. Nugrus, **(E)** *Cerates Cerates*, **(F)** *Compsobuthus werneri*, **(G)** Dabb in Wadi Nugrus, **(H)** *Isabelline whe*, and **(I)** *Gazella dorcas*.

of the hydrochemical analysis showed that two dominant water types are distinguished; the first is sodium-chloride water type and the second is sodium-sulphate water type. Groundwater of Um Ghannam and W. El Gemal wells is suitable for drinking and domestic purposes but after conducting microbiological analysis. On the other hand groundwater of the four wells is excellent to very satisfactory for all classes of livestock and poultry and does not exceed the suitable limits of irrigation water. According to Sawyer and McCarty (1967), the water of W. El Gemal and Um Ghannam wells can be classified as hard water, while the water of Hafafit and Hofifit wells can be classified as very hard water. As a conclusion, all these qualities qualify Wadi El Gemal to be a suitable location for settlement and developing processes in the southern part of the Red Sea area.

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تقييم الموارد الطبيعية بحوض وادى الجمال، البحر الأحمر، مصر

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الملخص العربـــى

تهدف هذه الدراسة إلي تنمية وادي الجمال كأحد أهم الوديان الرئيسية في جنوب الصحراء الشرقية لمصر. حيث أنه يربط الطريق الأسفلتي علي ساحل البحر الأحمر- عند الكيلو 52 جنوب مدينة مرسي علم- بطريق الشيخ سالم-الشيخ الشاذلي. ولذلك يقترح الباحثون تعبيد هذا الوادي ليصبح طريق أسفلتي.

تم عمل دراسة بعض عناصر المناخ في منطقة حوض وادي الجمال مثل درجات الحرارة، الرطوبة النسبية و سقوط المطر. ونظراً لبعد المنطقة عن أقرب محطة أرصاد في رأس بناس, لذلك تم إستخدام جهاز يدوي لقياس الحرارة و الرطوبة النسبية و كشفت هذة الدراسة أن حوض وادي الجمال يتميز بأنه حار جاف صيفاً ، وشديد البرودة رطب شتاءً.
إن المصادر الطبيعية مثل المياه و الصخور و التربة الزراعية و الثروة الحيوانية و النباتية تعتبر ضرورية جداً لأي نوع من التنمية في وادي الجمال، وللوصول إلي ذلك الهدف تم دراسة جيومورفولوجية وادي الجمال و كذلك دراسة المخاطر الطبيعية التي قد يتعرض لها و كذلك المصادر الطبيعية الموجودة مثل المياه و الصخور و التربة الزراعية و الثروة الحيوانية و النباتية.
نتج عن الدراسة الجيومورفولوجية رسم خريطة جيومورفولوجية تفصيلية، وتبين من هذة الدراسة أن حوض وادي الجمال يعتبر من الأحواض الكبيرة والتي يمكن أن يكون مجري للسيول القوية علي فترات متباعدة. ولذلك فقد إقترح الباحثون عدة أماكن لإقامة السدود في مجري الوادي للحد من هذة السيول من جهة وتخزين المياه من جهة أخري، وكذلك إقترح الباحثون أماكن حفر بئرين في مجري وادي الجمال. وقد بينت الدراسة أن الظواهر الطبوغرافية في وادي الجمال هي من الرتبة الثانية و الثالثة.

تم عمل تحليل لعدد أربع عينات مياه من أربعة ابار في حوض وادي الجمال وهي بئر وادي الجمال و بئر حفافيت و بئر حفيفيت ثم بئر أم غنام. وأظهرت النتائج أن المياه في بئر أم غنام وبئر وادي الجمال هي الأصلح للاستخدام الادمي. وأوضحت الدراسة أنه يمكن زراعة المنطقة في مصب وادي الجمال إذا توافرت المياه، سواء المياه الأرضيه أو مياه الأمطار و السيول أو من تحلية ماء البحر. كما يمكن زراعة المحاصيل التي تتحمل ملوحة الأرض مثل فول الصويا و المانجروف ، كما يمكن أيضاً زراعة مجري الوادي نفسة حيث يمتاز بالتربة الصاحة للزراعة.

توجد كمات كبيرة من الزلط بين مصب وادي الجمال و مصب وادي ريماريم للشمال والتي تصلح لأغراض البناء، كما توجد كميات هائلة من الجلاميد ذو الأشكال الكروية و الألوان المختلفة والتي تصلح كأحجار للزينة.
يوجد في وادي الجمال ثروة نباتية هائلة تتمثل في النباتات الطبية مثل الأراك و الحرجل و الهجليج (بلح السكر)، بالاضافة إلي السنط و الأثل وأما أشجار النخيل و المانجروف فتوجد عند المصب. و يوجد ثروة حيوانية هائلة من الثديات و أهمها الغزلان و الارانب البرية و الثعالب و من الزواحف و أهمها الضب و كذلك من الطيور و أهمها الحمام الجبلي و السمان و القطا. هذا و لم يسجل الباحثون أي نوع من الحيوانات المفترسة في حوض وادي الجمال. و أخيراً فقد خلصت الدراسة إلي أن وادي الجمال مكان مناسب و يستحق أن يوضع في برامج التنمية لمحافظة البحر الأحمر المصرية.