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# NEW URBAN CENTERS IN THE RID ZONES
# THE CASE OF THE SOUTH REGION OF EGYPT

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# NEW URBAN CENTERS IN THE ARID ZONES: THE CASE OF THE SOUTH REGION OF EGYPT

MOHAMED SALAH BASSIOUNI, Ph.D.*

"It appears that only urbanization can permanently develop the arid lands."
(A.H. Esser, 1974, p.7)

"Modern technology has made arid zones more habitable and less remote."
(C.O. Hodge, 1974, p.2)

## I. INTRODUCTION:

### 1.1. Reasons for Arid Zone Development:

The arid zones[1] are commanding attention today. The world has begun to realize the vast mineral wealth and the enormous solar energy potential they contain. Many see the arid lands and deserts as the world's last great reservoirs of open space, frontiers that man can farm and make habitable with new technology.[2] This is the bright side of the issue. The pessimistic side sees the future of the world's dry zones darkly. These lands that need technology the most desperately will find it will take 40 years and 20 billion dollars just to reclaim the land lost to deserts in

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the past 25 years. Who will provide that money, even if protecting the soil is the most rational investment on earth?"[3]

Actually, practical experiments through the past two decades have supported the first opinion. Continued efforts are being made in many countries, especially in the Third World, to reclaim, allocate, and develop different economic activities and new human settlements in arid zones. For example, Arab Gulf States, China, Egypt, India, Iran, Israel, and Saudi Arabia have made great strides and have found ingenious ways of living with aridity. On the international level some 200 desert research institutes, brought to life and activity in 40 countries, have produced the 30 large volumes of UNESCO's Arid Zones Research series.[4] Moreover, the United Nations held a conference on desertification in Nairobi in 1977 to discuss and exchange the experiences of different countries with desertification.[5] The main reasons for all of these efforts to defeat desertification and exploit the arid lands are the pressures of population on one hand, and advancing technology on the other, as we shall explain.

1.2 Inquiries of the paper:

Egypt is one of these countries with a majority of its area arid land. About 96% of Egypt's area is desert and arid land. The battle between man and aridity is as ancient as the Egyptian civilization. The issue is that Egypt cannot

afford to lose an inch of its arable land. Its population is growing explosively. So the only available solution, in both the short and long runs, is to redistribute a part of its population, from the very congested narrow valley and the Delta, towards new polarized urban centers in its arid areas that have numerous natural potentialities.

In this paper, we will try to develop one of the ideas which can play an active role in solving the population problem in Egypt. The high rate of population growth in the country represents a severe pressure on the limited agriculture area. This situation is the main challenge facing Egyptian development strategies.

The point is that the South Region of Egypt (SRE) has several natural potentialities around Lake Nasser, on the Red Sea, and the New Valley. Constructing and developing new urban centers within the SRE will provide more varied job opportunities and a better way of life than that prevailing in the traditional communities or in the slum areas in the large cities. It seems that this is the only effective way to accommodate the ever growing population in Egypt.[6]

Therefore, this paper will emphasize the demographic transition that could take place up to the year 2000. Our assumption will depend on three alternatives to absorb a great portion of the population increase during the next fifteen years.

## II. URBANIZATION IN ARID ZONES:

### 2.1 Urbanization Versus Desertification:

Creation of a new way of life is the main purpose of urbanization in the arid zones. This means that "creation versus adaptation must then form the essence of all images that arise from thoughts of urbanization in the arid zones;" in other words, "creation for adaptation is the process needed."[7] With this statement Aristide Esser prefaces the works of a symposium on "Urbanization in the Arid Lands" held in 1970 in Chicago to discuss the economic, industrial, and social aspects of arid-land use.[8] The works of the symposium mostly reflect the United States' experience in the western and southwestern states, especially in Arizona, California, Nevada, New Mexico, and Utah. In addition, there were two papers in the symposium about an Israeli historical study of arid land use in the Negev, and South Africa's experience in the Namib Desert.[9]

The works of this symposium did not mention Third World experiences, nor did they show any kind of framework or direction for urbanization in arid zones. In fact, we might argue that the three cases - the U.S., Israel, and South Africa - are special cases from several points of view. Economically, they have enough investments and capital from different sources. Technologically, they apply advanced and expansive equipment and techniques. Politically, they could attract more capital and investors than many other countries

in the Third World. However, we should say that it does not mean that Third World countries have no experiences, economic potentialities, or human resources to deal with arid lands. Rather Third World and Socialist Countries, especially the Soviet Union, have remarked experiences in this field.

The United Nations conference on Desertification brought together the international experiences in the arid lands. It was held in 1977 in Kenya, Africa (the continent suffering from the most aridity in the world). The conference dealt with one main issue: how the world can protect its people from the development of desert and aridity.[10] The conference focused on a plan of action or a guide as to how the world should confront and defeat the problem.[11] Moreover, the important point was the new multidisciplinary view towards desertification and aridity, not as a peculiar subject but as a new concept spread around different disciplines. Therefore, the Secretariat gathered together specialists in 19 disciplines. They included soil science, veterinary science, watershed management, climatology, meteorology, ecology, geography, anthropology, demography, biology, economics, political science, sociology, history, and agronomy.[12] It means that the problem of aridity around the world has taken such serious directions. "It appears that only urbanization can permanently develop the arid lands." (A.H. Esser, 1974, p. 2).

## 2.2 Urban Centers in the Arid Zones: Goals and Limitations:

There are three main goals: economic, social, and political. The economic goal concerns the exploitation of mineral resources, expansion of agricultural areas and production of new crops, establishment of plants and the allocation of some kinds of industries with the benefit of low prices and suitable climate.[13] The introduction of job opportunities is both an economic and social goal. One of the most important social goals is to absorb part of the rapid increase in population growth and to avoid creating more congested urban areas. However, the political and strategic goal has become one of the important goals for the new urban centers and development of the arid lands, mostly across the empty borders between countries. This last goal is very clear in the Middle East, especially in Israel.[14]

Although, the establishment and development of new urban centers in the arid zones have become a national priority in most over-populated countries around the world, the fact is that creation and adaptation of urban settlements in the arid zones, with their environmental and ecological conditions need tremendous efforts from many sides.

In addition, the creation of new urban centers in such zones raises several points concerning the requirements of these urban centers. Most important are the economic bases,

water resources, and infrastructure. These factors represent significant limitations on the attempts and projects for urbanization in the arid lands.

2.3 Conditions of Urban Centers in the Arid Zones:

There are some differences between a new town within a traditional area[15] and a new town in an arid zone. The environmental and ecological factors have played a remarked role; however, the main lines and ideas of a "new town" are included in both of them. But the previous limitations in the arid lands have put some constraints before the urban planners. Also, the high cost of settlements in the arid zones adds several functions to such settlements. So, even though it could be like a town or a small city, such a town in the arid lands has to be an independent urban center under such circumstances.

However, we might conclude that at least six fundamental factors or conditions determine the creation of a new urban center in the arid zones.

2.3.1 The Economic Bases:

Mineral resources, industry, and specific agriculture crops, represent most of the potentialities from which the economic base of urban centers in the arid zones could be derived. The point here is how the capital and investments, public or private, are attracted to develop these arid zones.[16] There are several examples around the world in this respect.

The migration in the United State of industry from the East to California during World War II and afterwards,[17] and the plants along its border with Mexico were clear evidence of rapidly growing manufacturing in arid zone cities. The Soviet Union also seems to be promoting manufacturing in some of its arid-zone cities. Lima, Peru shows a new evidence of rapid industrialization in arid zones.[18] That means new employment opportunities, absorbing population, and development of new urban centers in the arid zones.[19]

2.3.1 Water Resources:

Most of the experts in the arid zone development programs consider that water resources are a crucial factor in creating new urban centers in such areas. Someone put it in a correlation statement: "Any attempt to increase the water supply will markedly increase the total production in the arid lands."[20] In fact, the urban centers in arid zones and "desert settlement has always been characterized by such focal concentrations around major water resources,"[21] but now, with technological progress, there are three ways to supply the urban centers in the arid zones with water: 1) transfer water from the nearest natural resources, especially rivers, either through specific canals or pipes; 2) groundwater mining, especially groundwater on low levels; 3) purification of seawater.[22] The problem here is the high

cost of these alternatives. Therefore, in its conference on 'Water', the United Nations has emphasized maximization and rationalization of water use with the help of new technological methods.[23]

2.3.3. Level of Technology:

Advancing technology is making obsolete the traditional view of the uses of the arid lands.[24] It is clear that technological progress has introduced radical solutions for many arid land problems, such as land reclamation, irrigation techniques, sun and wind energy, water purification, power stations, and numerous kinds of equipment for different purposes. In fact, "modern technology has made arid zones more habitable and less reme."[25] Nevertheless, there are two important points. First, the poor countries need capital, especially from outside, to get and use this advanced technology and equipment. Second, the political role, especially with highly developed countries, has played a significant role in providing both capital and technology on a large-scale level. However, the poor countries have to rationalize their choice of technology under these conditions.

2.3.4. Infrastructure:

Any serious arid-zone development under modern conditions requires the provision of an adequate infrastructure including roads, power network, water supply, transportation,

social services (educational health, cultural, welfare, and recreational facilities). The problem here also is that the cost of providing an adequate infrastructure for new urban centers in such zones is quite high. The main reason is the wide empty land or sparsely occupied land on which the new urban centers should be located. Many planners and developers still consider the excessive cost of infrastructure to be one of the most severe impediments for arid zone development.[26]

2.3.5. Housing Patterns:

The urban centers in the arid zones need special innovative housing design, practical construction and planning that stresses climate. This needs an inter-disciplinary approach and the aid of planners, developers, architects, urban designers, landscape architects, architectural engineers, and scientists.[27] However, the climate and building material are two essential components in determining the housing patterns of urban centers in the arid zones. The relationship between climate and housing patterns in particular, has long been misunderstood. Therefore, special architectural features, according to climate and building material, must be taken into consideration.[28] The socio-cultural features of population also should be emphasized in the housing of arid-zone urban centers. Moreover, the design of these urban centers

should consider environmental and social changes in the future.[29]

2.3.6. Population:

Who will migrate or choose to live in these new urban centers in the arid lands? Persons of which age, sex, skills, would be attracted to such urban settlements? What kind of behaviors, traditions, norms have to change? Many questions should be answered in this component. However, different reasons have rushed man to develop these lands and create a new style of life under certain environmental conditions. So, one of the most important purposes of the new urban centers in arid lands is to absorb a portion of the population from the overpopulated areas. Of course, these new urban centers are not a magic solution to the population dilemma in the poor countries, but they are one effective alternative. In respect to population size it depends on the previous factors, and mainly on the types of economic activities and infrastructure facilities in such arid lands. City planners believe target populations of most new urban centers are probably more a function of the investments, capacity, and economic characteristics of the area.[30]

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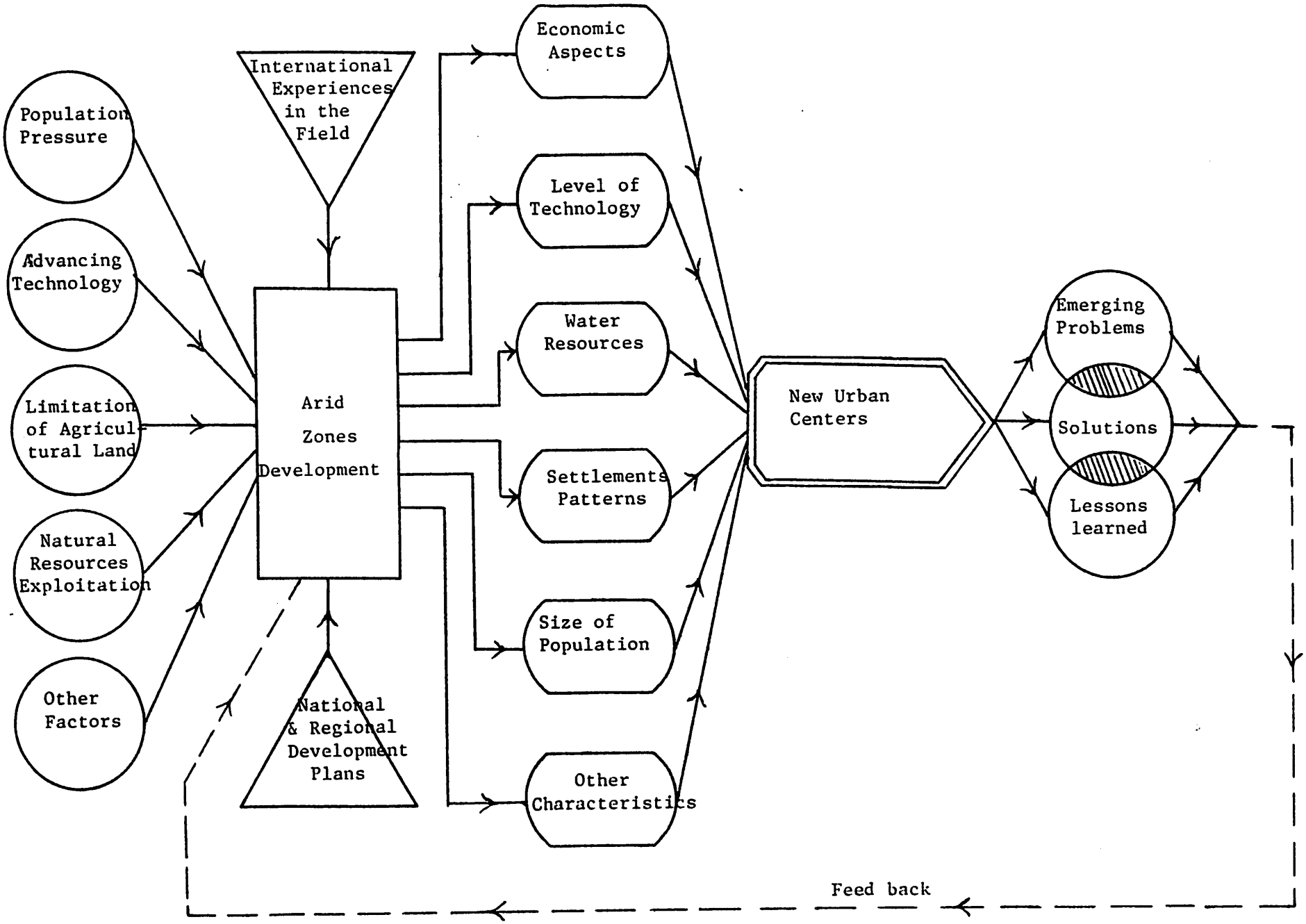
As we can see, the development of new urban centers in the arid zone is a recent field in general and an outcome of

both population pressure and technological progress. Furthermore, this field interplays with many other dimensions such as regional and national development strategies, natural potentialities, political ideology, economic policies, pressure of a rapid increase in population, limitations of cultivated land, and accessibility of advanced technology. All of these are essential and integrated factors and we cannot neglect any of them. Generally, urbanization in the arid zones has become one of very few options in poor countries, especially in Africa and Asia, to solve partly its severe and pressing socio-economic problems.

On the other hand, this paper cannot claim that it covers this important issue. So, we try to express our ideas quite clearly through formulating the main items of arid-zone development and urban centers in the following chart: (see next page)

# ARID ZONE AND URBAN CENTERS DEVELOPMENT



## III. CASE OF THE SOUTH REGION OF EGYPT

The idea of development of the arid south region of Egypt appeared when the construction of High Dam in upper Egypt had been completed in the beginning of the 1970s. The High Dam project, which was started in 1960, has brought to this region a great deal of attention on different levels in Egypt. But the serious steps to achieve the idea have started with the Open-Door economic policy in 1975 with different attempts to attract Arab and foreign capital to invest in development projects in Egypt. Unfortunately, this economic policy has not worked well in Egypt, and it did not solve any of its severe problems.[31]

Nevertheless, the South Region of Egypt (SRE) has received many efforts on both official and public levels. Recently, the United Nations Development Program has done a preliminary study to determine the feasibility of establishing priorities for the project. On the national level many scientific institutes, universities, and ministries have shared in studying the area of the project also the American Center for Earth and Planetary Studies shared in these scientific studies and surveys on the South Region of Egypt.[32]

The SRE is located between $22^{o}$ and $26^{o}$ north latitudes. The SRE includes four governorates: Qena, Aswan, Red Sea, and New Valley. The Northern boundary of the region follows the northern administrative boundaries of the New Valley,

Qena governorates and the area south of Safaga in the Red Sea governorate, down to the Egyptian/Sudanese border in the South. The Red Sea is the eastern boundary and the Egyptian/Libyan border is the Western boundary for the SRE. The northern boundary of the SRE is considered relatively flexible and may be adjusted - if required - to meet important planning considerations.

3.1. Socio-economic Advantages of Development of the Region:

A high rate of population growth and increasing population pressure are problems facing Egypt. It is estimated that by the year 2000 the Egyptian population may reach 70 million[33] (about 44 million in 1982). If we want to complicate the problem we shall find that the human settlement of Egypt had traditionally been enclosed within the Nile, Delta and Valley. Productive activities had and still are using only 4% of the available national territorial space, while 96% of this national space is not contributing to development efforts in Egypt. In fact, this wide unexploited space is rich in natural resources that can be actively engaged in the development process. That means enhancing standards of living through generating new employment opportunities and creating new production and new urban centers outside the traditionally congested areas of Egypt.[34]

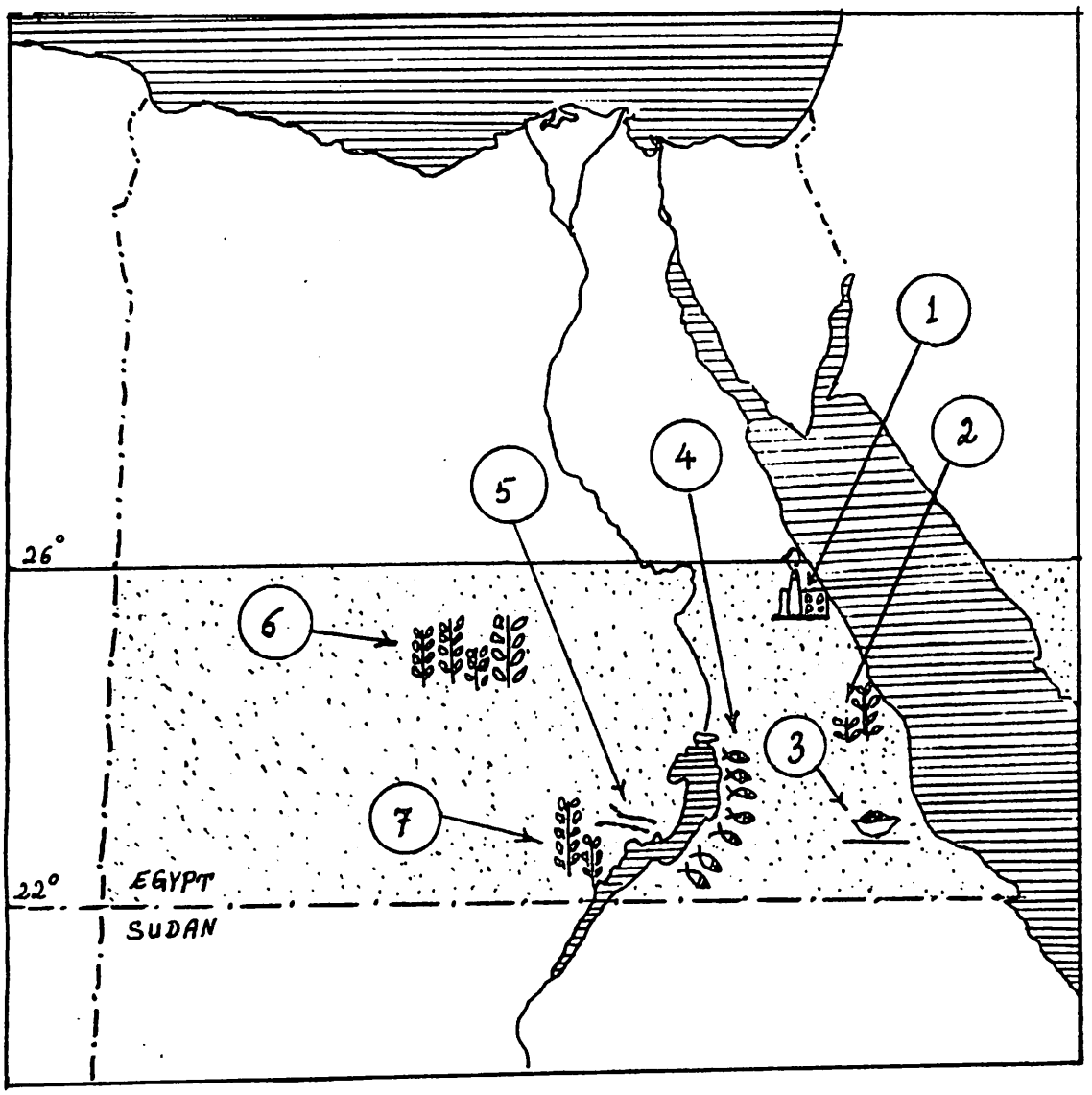
The development plans on both national and regional levels could play an active role in helping to remedy the existing imbalance between governorates and regions in the country. The South Region of Egypt (SRE) represents over 50% of the

total national area. The region is potentially one of the richest in the country in natural resources. If Egypt exploits these resources, she can successfully redistribute the national population, or at least the expected increase, among the national territorial space. The SRE area can thus absorb a sizable portion of this expected increase in population up to the year 2000, as we will show next.[35]

Furthermore, the SRE is adjacent to the Sudan and this location could give the attempts at development and the complementarity of the two countries push for adequate exploitation to the South of Egypt and North of the Sudan. Also, the planners believe that "construction of paved road, rail raods, and other basic infrastructure in the SRE serves, in addition to benefiting the regional development, in making Egypt, a 'natural' inlet and outlet for Africa to the Mediterranean Sea. This would greatly be of benefit to the Egyptian national development in terms of benefiting from the passage of African/European trade and offering transit services."[36]

Toward the east, the SRE borders the Red Sea and can therefore increase the cooperation between Egypt and Saudi Arabia in terms of exploiting the natural wealth of the Red Sea and offering tourist and transit services through the Egyptian Red Sea ports of safaga, Qussir, Mersa Alam, and Bernis. This will also serve to connect West African countries to the Holy lands in Saudi Arabia.[37] See next map of the SRE region.

Location of the South Region of EGYPT*




Legand:

1. Mineral raw-material plant.
2. Feasibility study for the reclamation of 40,000 feddans.
3. Phosphate plant (Red Sea Region).
4. Rehabilitation of Lake Nasser Region to consolidate Egyptian-Sudaneze relations together with the production of an initial amount of 23,000 tons of fish resources annually.
5. Erection of Toshki canal for the plantation of the New Valley & Southern Valley regions.
6. The reclamation and plantation of three million feddans.
7. The reclamation and the plantation of one million feddans near Lake Nasser.

*Source: This map is adapted from a study entitled "A project for South Egypt: A Major Project of Comprehensive Development," Reviewed by the Economic Unit, Al-Ahram daily, Cairo, Egypt: May 27, 1977, p. 5.

## 3.2. Potentialities of the South Region of Egypt:

The region is rich with numerous natural resources such mineral deposits, oil, and fish. The availability of surface and underground water give the possibility of land cultivation, the grea expanses of beautiful beaches and excellent climate gives immense potentialities for the tourism industry in this region. The paper will present a brief idea about the major potentialities in the region according to the available preliminary studies.[38]

### 3.2.1. Water Resources:

The surface water supply is available in Lake Nasser for both agriculture and agriculture use around Lake Nasser. The problem is that to expand the water supply to the future urban centers in the rest of the region requires an adequate system and infrastructure. On the other hand, the volume of the underground water in the region is not exactly known. Intensive studies are needed to put the plans of agriculture, industry and urban centers according to the findings of these studies.

### 3.2.2. Agriculture and Land Resources:

There is great potential for reclamation of new lands in the RSE. Also, there are undoubtedly soils on which production can be achieved. That will help in diversifying the crops in the region since sugar is currently the only

major crop there. In regard to the fisheries sector, there are tremendous fishing potentialities in the RSE in Lake Nasser, the Red Sea, and the River Nile. Short and longrun plans are needed to establish an integrated industry in this vital sector in the region.

3.2.3. Mineral resources:

The SRE has considerable mineral potential. Iron and phosphate are the largest mineral resources in the region. A number of other ores are processed and utilized in the SRE, including seasalt, quartz, clays, limestone, granite, and sandstone. The important point is that the geology of the region is well documented and mapped. Also, mineral resources on land and offshore were the exclusive property of the states, but the government has begun to encourage private enterprise in mining activity with Egyptian participation. Therefore a rational exploitation of these mineral resources in the SRE will give industrial development a big boost both at the regional and national levels.

3.2.1. Tourism:

It constitutes an important sector of the economy of the SRE. The historical pharaoh's civilization, the climate, the Red Sea coast, the Nile Valley, together with the natural hospitality of the people and their long experience of tourism, continue to offer an exceptionally attractive location for visitors. The tourism industry in

Egypt did not participate in the great tourism boom of the 1960s because of political and military reasons. Such an integrated national and regional strategy for tourism must now be prepared to establish an optimum rate for the sector's growth.

3.2.5. Infrastructure:

There are some distinctions in the infrastructure among the three main axes of the SRE. Both the Red Sea and the New Valley axes have some difficulties and problems with some types of infrastructure such as water supply and sewerage. The middle axis in the SRE is relatively better than the other two axes. In general the status of roads and electricity are better while utilities and telecommunications are inadequate in the whole country. The SRE particularly has been neglected and only in recent years the Government has recognized the need for an intensive program for rehabilitation. So, in the 1978/82 Plan, almost 50% of public investment has been allocated for infrastructure. However, the SRE needs more and better roads, rail network, airports and ports as key bases of the region's development.

As we can see, the SRE has in existence "pull" factors in most of its sectors. If development attempts succeed, this region will be a radical development in Egypt. Her people, especially the new generation, will escape from the traditional congested space of economic activities to a new urbanized life.

3.3. Population Alternatives for the SRE (A Proposal):

If we agree with the theory that says that the urban centers and their population size are a function of the investments and economic characteristics of such centers, as we mentioned, we might argue that the same theory fits the expected development of the S.R.E. In other words, the capacity of the region to absorb such a large proportion from the national population increase depends on the integrated efforts of development in the SRE.

The most important strategic purposes of the SRE development is to absorb a half of the national population increase up to the year 2000, which was estimated to be more than 20 million people. It means that, if the maximum development efforts are directed to the region, its population should reach 10 million, 60% of them coming from outside the region.

Our assumption is that the population increase of the region could depend on two sources; first, the rate of annual increase of the population of the region itself in a given year (this rate is 2.28% as on the national (level); second, the annual number of population who should be attracted to or emigrate from outside the region (as a result to change the internal migration waves towards it).

The important point is that the area of the SRE represents over 50% of the total national area (see map 1).

TABLE 2. Urban, Rural, and Sex Distribution of Population in the South Region of Egypt Census Year 1976*

| Governorates of the SRE | Urban | Rural | Total | Male | Female | Total |
|---|---|---|---|---|---|---|
| Qena | 392,079 | 1,131,220 | 1,709,299 | 860,297 | 849,002 | 1,709,299 |
| Aswam | 234,340 | 384,178 | 618,518 | 308,165 | 310,353 | 618,518 |
| Red Sea | 48,438 | 6,977 | 55,415 | 30,238 | 25,177 | 55,415 |
| New Valley | 34,769 | 50,406 | 85,175 | 43,407 | 41,768 | 85,175 |
| TOTAL | 709,626 | 1,758,781 | 2,468,407 | 1,242,107 | 1,226,300 | 2,468,407 |

Source: *CAMPS. Statistical Yearbook: Arab Republic of Egypt 1979, Central Agency for Public Mobilization and Statistics, Cairo: July 1980, pp. 7-8.

Nevertheless, the size of population of the whole region represents just 6.5% of the total national population. When we calculated the expected number of the region's population by the year 2000 according to the rate of annual increase in Egypt we found the total population of the region will be 4,053,336 people without adding any number from outside the region. This size represents 5.8% of the total national population when Egypt reaches 70,000,000, its expected size by the year 2000.

In other words, the percentage of the population of the region will remain, representing just a very little percentage from the total national population if the region will not develop.

In the case of developing the region its demographic situtation will significantly increase. We suggest three alternatives. First, as a population target to the region by the year 2000, we put the first expected size of the region at 10,000,000. The number of people who have come in every year from outside the region should be 336,737 people as a fixed number for 15 years. As a practical proposal we could start in 1986 until 2000. Second, with a population target of 8,000,000 in 2000, the region has to receive 223,484 people annually as a fixed number besides the annual rate of total population. Third, in this alternative we assume that the rate of development in the region will be less than the high rate of economic growth in the first or the second alternative. Therefore the region will receive annually 110,231 people during the proposed first phase of the project from 1986 until the year 2000. As Table 2 there is quite a difference in the annual population increase according to each alternative.

This proposal attempts to say that the serious development which could be directed to the SRE will serve the national goals at least from the demographic and economic points of view. The attractive job opportunities, the different kinds of incentives and facilities would shift the migration waves to lower Egypt. However, if the development of the region takes place such a demographic transition might occur as a result of the new economic activities, new urban centers and new style of life.

TABLE 2. The Annual Expected Total Population of the South Region of Egypt according to three alternatives until the year 2000*

| Year | First Alternative 10 million population | Second Alternative 8 million population | Third Alternative 6 million population |
|---|---|---|---|
| 1985 | 2,890,359 | 2,890,359 | 2,890,359 |
| 1986 | 3,292,996 | 3,179,743 | 3,066,491 |
| 1987 | 3,704,814 | 3,475,725 | 3,246,639 |
| 1988 | 4,126,020 | 3,778,456 | 3,430,894 |
| 1989 | 4,556,831 | 4,088,089 | 3,619,350 |
| 1990 | 4,997,463 | 4,404,781 | 3,812,103 |
| 1991 | 5,448,142 | 4,728,694 | 4,009,251 |
| 1992 | 5,909,097 | 5,059,992 | 4,210,893 |
| 1993 | 6,380,561 | 5,398,544 | 4,417,134 |
| 1994 | 6,862,775 | 5,745,115 | 4,628,076 |
| 1995 | 7,355,984 | 6,099,588 | 4,843,828 |
| 1996 | 7,860,437 | 6,462,142 | 5,064,500 |
| 1997 | 8,376,392 | 6,832,963 | 5,290,202 |
| 1998 | 8,904,111 | 7,212,239 | 5,521,051 |
| 1999 | 9,443,861 | 7,600,162 | 5,759,163 |
| 2000 | 10,000,000 | 8,000,000 | 6,000,000 |

* Table 2 is counted on the basis of two variables. First, the rate of annual increase of the population of the SRE which according to the 1976 census is 2.28% in Egypt.[39] Second, the annual given number of population who should have migrated to the SRE by the year of 2000 in three alternatives 10, 8, or 6 million people.[40]

## IV. CONCLUSION

People in Egypt have become very sensitive and feel bored when someone talks about the serious problems of rapid population growth. People are looking for practical solutions, not empty slogans. Any observer of the Egyptian scene in the 1970's would easily find many vucuous slogans such as green revolution, administrative revolution, invasion of desert, battle of prosperity, etc. However, we believe that such slogans never solve any problems.

In contrast, if the SRE project succeeds, it would introduce a radical example for facing not only the population problem but also many other related problems. But, as a matter of fact, creating an urban life in the arid lands, as we mentioned, is a challenge. In a case like Egypt the options are very few, or perhaps there is no option in exploiting the available natural resources in its arid lands.

The change in the internal migration waves in Egypt towards the SRE will be a tremendous shift in modern Egyptian history. Establishment of the High Dam in Upper Egypt and the developmental wakefulness in the beginning of the 1960s started this way but, unfortunately, have not continued, mostly for political reasons.

There are about thirty years of practical experiences with the arid land in Egypt. AL-Tahrir province in the eastern Delta, EL-Salhia in the western Delta, Apis in the northern Delta, New Valley and New Nubia in Upper Egypt -

within the SRE area. All of these development projects and resettlement schemes were based on the principles of arid land development as an effective solution for the growing unbalanced relationship between population growth on one hand, and decline of the cultivated land on the other hand.[41] These attempts at arid lands development in Egypt have to be studied very carefully to learn different lessons from them. Also, the numerous international experiences with their technology and techniques are available to exchange different experiences.

In brief, for Egypt arid zone development is a vital option from a strategic point of view, and urban centers are the essence of such development from a technical point of view.

Finally, the South Region of Egypt project could fulfill in the long run the following goals:

1. Absorb a great portion of the national population increase.

2. Change the internal migration waves to the region instead of going north to the congested urban centers.

3. Add new cultivated land to the limited and declining land in the traditional area.

4. Diversify the agricultural production and industrialize part of this production.

5. Create an advanced industrial base in the region depending on its available mineral resources.

6. Create a series of urban centers as development poles along the region.

7. Establish a great fishing industry, especially on Nasser Lake and the Red Sea coast.

8. Develop the tourism sector as an important industry in a region with such a rich potentialities.

9. Create effective cooperation between Egypt and the Sudan, Libya, and Saudi Arabia.

If we may recapitulate, Egypt is facing a serious interplay of problems, namely; rapid population growth, geographic over-concentration of her population, erosion of arable land, accumulated shortage of housing, deterioration of physical and social infrastructure of major cities, modest success of rural development. Such dilemmas cannot be solved with limited developmental projects or interrupted Five-year plans since 1965. Doubtless, the large-scale schemes, such as the project of South Region of Egypt, are the rational long-run solution and the effective long-range alternatives to our problems. Egypt has a surplus of a highly qualified personnel, an adequate practical experience, and a solid starting base in the region - i.e., High Dam and Lake Nasser. All these domestic potentialities combined with the regional and international financial and technical assistance programs, are sufficiently enough to achieve these projects, for Egypt's future generations.

NOTES

1. The scientists mostly divide the dry areas into three categories; the hyperarid or extreme desert zones, the arid zones, and the semi-arid zones. In many cases, there is an overlaping between these categories. These dry areas already cover about one-third of earth's landmass and support some 720 million people, a sixth of the world's population. However, the largest part of these dry areas is located in Africa, Asia, and Australia respectively. See a good piece of work about desert and arid zones; The Desert: An Age-Old Challenge Grows by Rich Gore, National Geographic, 155:5 (November 1979) 586-639.

2. Gore, Ricj, The Desert: An Age-Old Challenge Grows. Op. cit., p. 595.

3. Ibid., p. 639.

4. Walls, James. Land, Man, and Sand: Desertification and its Solution, New York: Macmillan, 1980, p. 5.

5. The United Nations Conference on Desertification, Nairobi, Kenya (August 29 - September 9, 1977) A/CONF. 74. This conference is one of the most important conference series which has een held by the United Nations and its organization in the 1970s to discuss major world problems. These series were started in 1972 by the United Nations Conference on the Environment in Stockholm, the on population (Bucharest, 1974), food (Rome, 1974), women (Mexico, 1975), cities (Vancouver, 1976), and water (Mar del Plata, Argentina, 1977).

6. A successful example of a new town in Egypt is "Kima" in Aswan Governorate. Kima was constructed as a single-industry town in the south of Aswan city. It was established, as Dr. Abu-Lughod says, "as a well-balanced community which should, as far as possible sustain itself and provide its moderate-sized population with their material, needs and services. See Ahmed Abu-Zeid. "New Towns and Rural Development in Egytp," AFRICA, 49:3, 1979, pp. 283-290.

7. Esser, Aristide H. "Preface" of Urbanization in the Arid Lands, edited by Carle O. Hadge & Carl N. Rodges, Lubbock, Texas: International Centre for Arid and Semi-Arid Land Studies, 1974, pp. 5, 7.

8. This symposium on "Urbanization in the Arid Lands" was held in December 1970 in Chicago, during the Chicago Meeting of the American Association for the Advancement of Science, to examine the nature and culture constraints upon the settlement in the arid environment. See. Carle O. Hodge & Carl N. Hodges, ed., Urbanization in the Arid Lands, op. cit., p. 3.

9. See Wrvin Yhuda Kedar. "Water Utilization by Roman-Period Cities of the Neger Desert, Israel," and Richard F. Logan. Urbanization in the Namib Desert, South Africa" in Carle O. Hodge and Carl N. Hodges. Urbanization in the Arid Lands, op. cit., pp. 15-33, 149-168.

10. The estimation of the total area of the world's deserts is 48,350,000 $km^2$ if which 5,850,000 $km^2$ are "extremely arid," 21,500,000$km^2$ arid and 21,000,000 $km^2$ semi-arid. This total is equivalent to 36% of the earth's surface. See, James Walls, Land, Man, and Sand, Desertification and its Solution, op. cit., p. 168.

11. Ibid, p. 11.

12. James Walls, in a comment on these numerous disciplines in the Conference of Desertification, says, "This was a list to give some indication of how desertification, conceptually, was spread around. Structuring the subject, the experts went on to say, provided the perfect opportunity to add ot it, fill gaps and lacunae, settle precisely where the topic stood in the panatheon of human knowledge." See, James Walls, Land, Man and Sand, op. cit., p. 10.

13. Amiran, David H. K. "Arid Zones Development: A Case of Limited Choices," in Yair Mundlak and S. Fred Singer, ed., Arid Zones Development: Potentialities and Problems, Cambridge: Ballinger, 1977, p.6.

14. There is a statistical study about the number and distribution of settlements on Israeli borders with Jordan, Lebanon, Syria, and Egypt. See, Alexander Berler. New Towns in Israel, translated by Chana Shmorak, Jerusalem: Israel University Press, 1970, pp. 47-55.

15. See. Evans, Hazel, ed., New Towns: The British Experience, Lodnon: Charles Knight, 1972, pp. 88-116.

16. Johnson, Byron L. "Economics of New Innovation Cities in the Arid West," in C.A. Hodge & C. N. Hodge, ed., Urbanization in the Arid Zones, op. cit., p. 265.

17. Amiran, David, H.K. "Arid Zone Development: A Case of Limited Choices," in Yair, imd; al amd S/Fred Somger, eds., Arid Zone Development: Potentialities and Problems, op. cit., p. 7.

18. Wilson, Andrew W. "Urban Growth and Manufacturing Employment in the Arid Zones," in C.A. Hodge & C.N. Hodge, eds., Urbanization in the Arid Zones, op. cit., p. 104.

19. Lichfield, Nathaniel. "Economic Opportunities in New Towns," in Harvey S. Perlotf & Neil C. Sandberg, eds., New Towns: Why-And for Whom?, New York: Prager, 1973, pp. 48-60.

20. Noy-Meir, Imanuel and Orshan, Gideon. "Primary Production as a Factor in Arid Zone Development," in Arid Zone Development: Potentialities and Problems, op. cit., pp. 129-136.

21. Toulan, Nohad A. "Urbanization in the Arab States: A Potential for Regional Settlement, Growth and Development," Paper presented to the Conference on the Development of Manpower in industry, Damascus, Syria: Industrial Development Center for the Arab State, July, 1971, p. 5.

22. There are three interesting studies about the water resources in arid zones in "Arid Zone Development: Potentialities and Problems, edited by Yair Mundlak and S. Fred Singer, op. cit., see: (1) Shmuel Mandel. "The Overexploitation of Groundwater Resources in Dry Regions," pp. 31-51; (2) M. Gordon Woman, "River Systems in Arid Regions: Implications for Water Management," pp. 53-65; (3) Ronald F. Probstein. "New Technologies in Water Purification and Their Application to ARid Lands," pp. 67-79.

23. See two papers from the documents of the United Nation as Water Conference, Mar del Plata, Argentina (March 1977), E/CONF.70/CBP/1, pp. 4-10, 25; (2) "The Promise of Technology: Potential and Limitations-Part One," E/CONF.70/CBF/2. pp. 5-19.

24. Wilson, Andrew W. "Urbanization of the Arid Lands," The Professional Geographer, 12:6 (November 1960), p. 7.

25. Hodge, C.O. & Hodge, C.M., eds., Urbanization in the Arid Lands, op. cit., p. 2.

26. Amiran, David H.K. "Arid Zone Development: A Case of Limited Choices," in Yair Mundlak & S. Fred Singer, eds., Arid Zone Development: Potentialities and Problems, op. cit., p. 5.

27. There are important collections about different sides of this subject. See Gideon Golany, ed., "Housing in Arid Lands: Design and Planning, London: The Architectural Press, 1980.

28. There are two interesting studies about the relationship between climate, economic and socio-cultural characteristics on one hand and the design of housing in the arid zones with application to the case of Egypt. See: (1) Hassan Fathy. "Planning and Building in the Arab Tradition: The Village Experiment of Gourna," in Morroe Berger, ed., The New Metropolis in the Arab World, New Delhi: Allied, 1963, pp. 210-229. (2) Nohad A. Toulan, "Climate Consideration in the Design of Urban Housing in Egypt," in Gideon Golany, ed., Housing in Arid Lands, op. cit., pp. 75-84.

29. These issues have been strongly emphasized in the recommendations of Habitat Conference. See: Habitat United Nations Conference on Human Settlements, Vancouver (May 31-June 11, 1976) A/CONF.70; document no. A/CONF. 70/A2, pp. 5-11.

30. See: Merling Pierre, New Towns: Regional Planning and Development, translated by Margaret Sparks, London: Methuen, 1971; pp. 246-248; Clapp, James A. New Towns and Urban Policy, New York: Dunellen, 1971, pp. 118-120.

31. There are two critical articles about Sadat's Open Door Economic Policy in Egypt. See Raymond William Bakar. Sadat's Open Door: Opposition From Within; and Gouda Abdel-Khalek. Looking Outside or Turning Northwest? On the Meaning and External Dimension of Egypt's "Infitah" in Social Problems, 28:4 (April 1981), pp. 378-384, 394-408.

32. See description for one of the interesting studying journy to the west desert of Egupt. Farouk EL-Baz, Journy to the Gilf Kebir and Urneinat, Southwest Egypt, 1978; and Future Work in the Southern Part of the Western Desert, The Geographical Journal, 146:1(March 1980), pp. 51-53, 19-93.

33. There is a statistical study about population estimation in Egypt until the year of 2000 according to the anticipated changes in fertility rates. See Kharazati, Nabil. The Population Trends of Egypt until the Year of 2000, Cairo: Institute of National Planning, 1968.

34. Fag, Ennor, M.H. Terms of Reference For the Regional Development Plan of South of Egypt, Cairo: Institute of National Planning, 1978, p. 1.

35. Tge expected increase until the year 2000 in the population of Egypt is up 20 million people. See: The Institute of National Planning. Regional Planning in South Egypt, Cairo: INP, 1978, p. 6.

36. Fag Ennor, M.H. Terms of Reference For The Regional Development Plan of South of Egypt, op. cit., pp. 2-3.

37. Ibid., p. 4.

38. Arab Republic of Egypt and the United Nations Development Programme. Regional Development Planning: Region 8; Interim Report, Vol 1., Cairo, Dar AL-Handasah Consultants, 1981, pp. 73-152.

39. The rate of population annual increase in Egypt between 1966 to 1976 is 2.28% which is the rate of annual increase between 1966 and 1976 censuses. See: Central Agency for Public Mobilization and Statistics. Statistical Yearbook of Arab Republic of Egypt: 1952-1979, Cairo: CAPMS, July 1980, p.4.

40. We put in the appendix the mathematical bases for calculating the estimated number of population of the RSE. See appendix.

41. There is an interesting study about this relationship between popultion and land in Egypt. See John Waterbury, "The Balance of People, Land, Water in Modern Egypt," Field Staff Reports, 20"1 (may 1975).

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# BIBLIOGRAPHY

Abu-Lughod, Janet
1981 "Characterization of the Urbanization process in the Arab Region. A paper was presented to workshop on population distribution and development in the Arab World, Kuwait; Kiwait University & ILO, (November 1981).

Abu-Zeid, Ahmed
1979 "New Towns and Rural Development in Egypt," AFRICA, 49:3.

Amiran, David H.K.
1977 "Arid Zones Development: A Case of Limited Choices," in Yoir Mundlak and S. Fred Singer, eds., Arid Zones Development: Potentialities and Problems, Cambridge: Ballinger.

Arab Republic of Egypt and the United Nations
1981 Development Program, Regional Development Planning: Regions, Interim Report, Vol. 1, Long Term Development Strategy, Cairo, Dar El Hardasah Consultants.

Baer, Gabriel
1969 Studies in the Social History of Modern Egypt, Chicago: University of Chicago Press.

Bakan, Raymond William
1981 "Sadat's Open Door. Opposition from within," in Social Problems, (April 1981)

Berler, Alexander
1970 New Towns in Israel," translated by Chana Shmorak, Jerusalem: Israel University Press.

Cairo Demographic Centre
1973 Urbanization and Migration in Some Arab and African Countries, Research Monograph Series No. 4., Cairo: C.D.C.

Clapp, James A.
1971 "New Towns and Urban Policy," New York: Dunellen.

El-Baz, Farouk
1980 "Journey to the Gilf Kebir and Uweinat, South Egypt." The Geographical Journal, 145:11 (March 1980).

El-Baz, Farouk
1980 "Future work in the Southern Part of the Western Deser." The Geographical Journal, 145:1 (March 1980).

Esser, Aristide H.
1974 "Preface of: Urbanization in the Arid lands, edited by Curle O. Hodge & Carl N. Hodge, Lubbock, Texas, ICASALS publication, No. 75-1.

Evansm Hazel, ed.
1972 New Towns: The British Experience. London: Charles Knight.

Fag, Ennor, M.H.
1978 Terms of Reference For The Regional Development Plan of the South of Egypt; Cairo: Institute of National Planning.

Fathy, Hassan
1963 "Planning and Building in the Arab Tradition: The Village Experiment at Gourne, in Morroe Berger, ed., The New Metropolis in the Arab World, New Delhi: Allied.

Golany, Gideon, ed.
1980 "Housing in Arid Lands: Design and Planning, London: The Architectural Press.

Gore, Rich
1979 "The Desert: An Age-Old challenge grows," National Geographic, 156:5 (November, 1979)

Hamdan, Gamal
1982 "The Personality of Egypt: A Study in the Genious Loci, Vol. 2, Cairo: Alam El Kotch Publisher.

Hodge, Carle O. and Hodge Carl N. ed.
1974 Urbanization in Arid Lands, Lubbock, Texas: International Center for Arid and Semi Arid Land Studies Publication, No. 75-1.

Institute of National Planning
1978 Regional Planning in South, Cairo, INP.

Johnson, Byroni
1974 "Economics of New Innovation Cities in the Arid West, in C.O. Hodge & C.N. Hodge, ed. Urbanization in the Arid Lands. Lubbock, Texas: International Center for Arid and Semir Arid Land Studies Publication, No. 75-1.

Kharazati, Nabil
1968 The Population Trends of Egypt until the year of 2000. Cairo: Institute of National Planning.

Lichfield, Nathaniel
1973 "Economic opportunities in New Towns in Harvey S. Perloff & Neil C. Sandberg, eds. New Towns: Why-and For Whom? New York: Parger.

Mandel, Schmuer
1977 "The Overexploitation of Ground Water Resources in Dry Region," in Arid Zone Development: Potentialities and Problems, Cambridge: Ballinger.

May-Neir, Imanuel, and Orshan, Gideon
1977 "Primary Production as a Factor in Arid Zone Development Potentialities and Problems. Cambridge: Ballinger.

Merlin, Piérre
1971 "New Towns: Regional Planning and Development, translated by Margaret Sparks, London: Methven.

Mundlak, Yair and Singer, S. Fred, ed.
1977 Arid Zone Development: Potentialities and Problems, Cambridge: Ballinger.

Nassef, Abdel Fatah
1973 "Internal Migration and Urbanization in Egypt" in Urbanization and Migration in Some Arab and African Countries, edited by Cairo Demographic Center, Cairo.

Perloff, Harvey S. and Sandberg, Neil, eds.
1973 New Towns, Why and for Whom? New York: Prager.

Probstein, Ronald F.
1977 "New Technologies in Water Purification and their Application to Arid Lands: in Arid Zone Development; Potentialities and Problems, Cambridge: Ballinger.

Toulan A. Nohad
"Climate Consideration in the Design of Urban Housing in Egypt," in Gideon Golany, ed., Housing in Arid Lands, op. cit.

Toulan A. Nohad
1981 "Urbanization in the Arab States: A Potential for Regional Settlement, Growth and Development." A paper presented to the Conference on the Development of Manpower in Industry. Damascus, Syria: Industrial Development Center for the Arab States (July, 1981).

United Nations
1976 Habitate: United Nations Conference on Human Settlements, Vancouver (May/June 1976), A/CONF. 70.

1977 United National Water Conference, Mar del Plata, Argentina, (March 1977), E/CONF. 70.

1977 United Nations Conference on Desertification, Nairobi, Kenya, (August/September 1977), A/CONF. 74.

Walls, James
1980 Land, Man and Sand: Desertification and Its Solution, New York: Macmillan.

Waterburry, John
1975 "The Balance of People, Land, Water in Modern Egypt," Field Staff Reports, 19:1 (January 1975).

Wilson, Andrew W.
"Urban Growth and Manufacturing Employment in the Arid Zones, in C.O. Hodge & C. N. Hodge, eds., Urbanization in the Arid Zones, op. cit.

Wolman, Gordon M.
River Systems in Arid Regions: Implications for Water Management" in Arid Zone Development: Potentialities and Problems, op. cit.

## APPENDIX

### The Mathematical Bases for Calculating Table No. 2

- Let 'a' be the starting population of the region
  (a = 2,890,359)
- Let 'r' be the annual growth rate of population of the region
  (r = 2.28%)
- Let 'x' be the number of people to be migrated into SRE.
- Let 'P' be the final population after 15 years.
  (P = 10m, 8m, or 6m).
- In one year
  population $p_1 = a(1 + r) + x$
- In two years
  population $p_2 = p_1(1 + r) + x$
  $= [a(1 + r) + x] (1 + r) + x$
  $= a(1 + r)^2 + x(1 + r) + x$

.
.
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- In n years

population $p_n = a(1 + r)^n + x(1 + r)^{n=1} + \ldots x(1 + r) + x$

- So $P = p_{15} = a(1 + r)^{15} + x(1 + r)^{14} + \ldots x(1 + x) + x$
- $a(1 + r)^{15}$ is like the future value of amount.
- a growing at rate r in 15 periods.
- The rest of the expression for P is like an annuity of amoung X, growing at rate r in 15 periods.
- The value for x can then be obtained from present value tables given P, a, r.

The calculation can also be done directly by a calculator, simplifying the expression as a Geometric Progression.

$$\text{So} \quad P = a(1 + r)^{15} + \frac{x\,[1 - (1 = R0^{15}]}{[1 - (1 + r)]}$$

$$= a(1 + r)^{15} + \frac{x[1 - (1 + r)^{15}]}{r}$$

$$\text{So} \quad x = \frac{[P - a(1 + r)^{15}]\, r}{[1 - (1 + r)^{15}]}$$

Now each of the values in Table 2 can be obtained by calculating each of the $P_1$, $P_2$ ... $P_{15}$ using a, r, and x.