Population Redistribution to Achieve Balanced Regional Sustainable Development in Upper Egypt (2006-2027)

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ABSTRACT

The main objective of the study is to present practical solutions for the problem of building (and demolition) on agricultural lands in Upper Egypt; shortage of available lands for urban expansion; limiting slum areas at cities margins and random building in rural areas; creating new communities that achieve sustainable regional development; and redistribution of population and labor force in Upper Egypt. The study depends on population census data of 2006 for future estimates. The study adopts the descriptive analytical approach. The main results were as follows:

- The problem of building (and demolition) on agricultural lands in Egypt represents a matter of life or death for the Egyptians.
- The present pattern of random housing in cities and villages is neither sustainable nor balanced.
- The traditional Egyptian villages must be re-planned without allowing for rebuilding old houses.
- It is imperative to look for new locations to establish new communities to absorb the population increase and satisfy housing needs.

The most important recommendations were as follows:

- Preventing building in old cities, especially at the margins close to agricultural lands.
- Preventing building on agricultural lands for any reason.
- Establishing new twin cities (and villages) at the western desert highway, from Giza to Aswan.
- Adopting the desert housing pattern (Hassan Fatehy engineering) to reduce costs and materials consumption.
- Relocating specific governmental agencies from old to new communities.
- Relocating boys secondary schools from old to new communities.
- Utilizing the evacuated buildings of secondary schools to decrease densities of primary and preparatory schools in old communities.
- Adoption of new and renewable energy sources, such as solar energy and biogas.
- Establishing factories for wastes re-cycling at suitable sites in new communities.
- Declaring a clear-cut stand as for no conciliation with building on agricultural lands, and imposing severe penalties up to land confiscation.

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1. Introduction

It is deeply established even among non-specialists in population studies that the population problem has three dimensions: The high population growth, the low level of population characteristics, and the imbalanced population geographical distribution. It is also well-known that most population strategies, policies, programs, and projects concentrate mainly on the first two dimensions, and neglect the third one. Regardless of the evaluation of such policies, the most dangerous problem at present is that of the geographical population distribution, which became highly concentrated and imbalanced. This imbalance generates more socio-economic and environmental problems as a result of the high population densities on the one hand, and widespread of random housing areas and building on agricultural areas on the other hand.

As for the population characteristics, almost all data, indicators, reports, and studies agree that Upper Egypt was, and is still, suffering from low population characteristic. The most important objectives are to improve the socio-economic characteristics of Upper Egypt population in general, and of rural areas, females and children in particular (El Bakly, 2016, pp. 40-24; El Zamly, 2016, pp. 180-182, 222-224, Zayyan, 1998, 2001, 2012).

Since the mid-1970s, Egypt has led a long way in the field of redistribution of population, housing, and economic activities. This has been achieved through creation of "Development Regions" and a series of "New Cities" according to the strategy of "Evacuating the old Valley and Conquering the Desert". However, it seems that the success achieved in this regard was no better than that in the other two dimensions, based on the high concentration of population, housing, and economic activities in the old Nile Valley and Delta in general, and in Greater Cairo in Particular (Zayyan, et al., 1998, pp. 1-5).

The final objective has to be to achieve balanced population distribution on the whole land area of the country, so as to relieve the high population densities on the one hand, and not to let empty areas for security considerations on the other. The lessons learnt from previous experiences indicate that providing public and social services is the first condition to make new communities attractive to migrant population, so as not to return to their old communities, as was the case with the experiences of "Tahrir Directorate" and "New Nubia" projects (Ministry of Housing, 1989, pp. 11-14).

1-1 Problem of the Study:

The problem of the present study is a result of many complicated factors that led to the high population densities in the old Nile Valley and Delta, appearance and growth of random areas, building on agricultural lands, and the urgent necessity to move to new communities in the desert, as follows:

- The high population growth rate,
- The limited land areas available for building in old cities and villages,
- Widespread of random housing areas in the old cities,
- High frequency of building (and demolishing) houses on high fertility agricultural lands, reclamation of low fertility lands in desert areas, and
- The multiple economic costs and losses incurred as a result of this dilemma.

1-2 Importance of the Study:

Importance of the present study stems from the possibility of presenting an accurate analysis of the process of building (and demolishing) on the fertile agricultural areas, and presenting some practical solutions for such a dilemma in Upper Egypt in particular, as follows:

- Exploring the extent of the dilemma of building (and demolishing) on agricultural lands,
- Presenting a practical solution for the aforementioned dilemma,
- Creating more job opportunities in the construction sectors in Upper Egypt, and
- Providing public and social services needed through modern technologies.

1-3 Objectives of the Study:

The main objectives of the present study are to present practical solutions for the problem of building on agricultural lands, as follows:

- To present practical solutions for the problem of shortage of building lands due to population increase,
- To conserve old and fertile agricultural lands neighboring old cities and villages,
- To construct new communities that achieve balanced sustainable regional development, and
- To achieve a balanced redistribution of population and economic activities, and limit internal migration to Greater Cairo and old cities.

1-4 The Location of the Study Area:

The present study concentrates mainly on the governorates of Upper Egypt - from Giza to Aswan in general, and on the areas extending from the west bank of the River Nile to the eastern margins of the western desert in particular – for the following:

- The whole area suffers from the lowest human development indicators during the last decades (INP, 2008, pp. 23-26),
- The whole area is a pushing area to Greater Cairo and major cities (CDC, 2000, pp. 21-36),
- The whole area suffers from limited agricultural and reclaimable lands (Ministry of Planning, 1996, pp. 3-15),

- The study area enjoys abundance of desert lands that can be utilized in construction of new communities (Ministry of Housing, 1989, pp. 11-14), and
- The presence of the western desert highway, which represents a great development pivot, can be utilized in redistribution of population and economic activities in Upper Egypt.

1-5 Data Sources:

The present study depends on official data of the population censuses, in addition to data published by official agencies, as for the actual and estimated population on the one hand, and the location of old and new cities in Upper Egypt on the other.

1-6 Limitations of the Study:

As for the spatial limitations, the study concentrates on the area between the west bank of the River Nile in the east, and the western desert highway in the west, along Upper Egypt governorates.

As for the time limitations, the study concentrates on the period 2006, as a starting point for population data, and extends to 2027 for estimations of population and housing needs.

1-7 Methodology of the Study:

The present study adopts the analytical descriptive analysis to describe and analyze the phenomena of high population growth and imbalanced population distribution on the one hand, and housing needs on the other. In addition, the study adopts the cartographic approach to indicate the present and suggested locations of old and new cities and communities, respectively.

2. Impact of Population Growth on Housing Needs, Upper Egypt (2017-2027).

Estimation of housing needs depends on the expected total number of population, and the rate of family formation on the one hand; and on the nature of housing needed, place of residence (urban/rural), and the economic level of the housing units as for area and quality (popular, economic, luxury, etc.) on the other hand.

The relative share of population in Upper Egypt governorates is expected to increase from 38% to 39% of total population in Egypt, according to expectations for the next ten years (2017-2027), as a result of higher population growth, in spite of net out-migration, as was the case for the last decades.

Comparing the inhabited areas in Upper Egypt governorates with the total areas of such governorates indicates abundance of desert lands suitable for construction of new sustainable communities, as indicated earlier, which is very clear in Figure (1), as vast areas of desert lands are available in Upper Egypt, especially in the western desert.

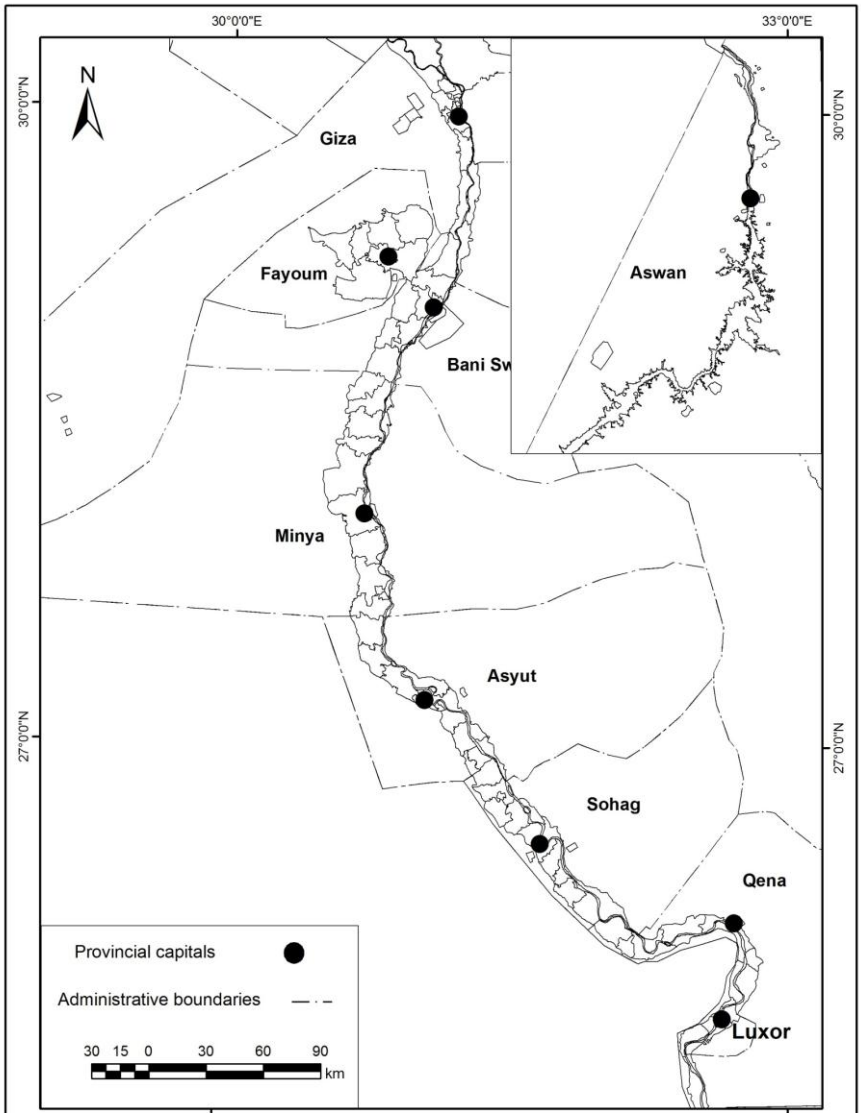


Fig (1) Administrative Map of Upper Egypt Governorates, 2016

Source: Prepared by the Researcher, based on Program Arc Gis 10.3

2-1 Size and Growth of population in Upper Egypt Governorates, 2017-2027:

According to the average assumption, which can be reasonably adopted, the total number of population in Upper Egypt is estimated to amount to more than 33 million in 2017, then to 36 million person in 2022, and 38 million in 2027. This is a high and a rapid population growth due to high fertility in Upper Egypt in general, and in rural areas in particular. As a result, on average, it is estimated that the total number of population in Upper Egypt governorates will increase by about 5 million during the coming decade. Simply, this means that the rate of family formation is estimated to be about 100 thousand family per annum. Accordingly, the minimum number of housing units required can be estimated for the newly formed families on the one hand, and for the purposes of renewal and reserves on the other. However, such needs are tremendous as for the carrying capacities of current residential communities to provide more housing units, create more job opportunities, or practice more economic activities. Hence, construction of new communities outside the old Valley and Delta becomes inevitable and urgent necessity.

2-2 Population Distribution by Governorate in Upper Egypt, 2017-2027:

Population of Upper Egypt are distributed on a strip of about 750 km long, on both banks of the River Nile, especially on the western bank, from Giza to Aswan, in addition to Fayoum Governorate which is separated from the Nile Valley in the western desert.

In general, the total number of population of Upper Egypt is still increasing due to the high and increasing population growth rate, which increased from an initial high level of 2.51% for the period 1976-1986, to 2.52% for the following period 1986-1996, and to 3.36% for the last period 1996-2006 (Zayyan, 2012, p. 55).

According to the last available data, the Upper Egypt governorates are still suffering higher population increase due to the higher crude birth rates. In 2015, while the natural increase rate for the country as a whole was 23.7 per thousand population, it was higher than that average in almost all Upper Egypt governorates: Beni Suef (30.), Fayoum (30.7), Menya (29.2), Assuit (27.6) and Sohag (28); and (26.8) in Qena. As for the crude birth rate, while it was 30.2 per thousand population for the country as a whole, it was higher than that average in almost all Upper Egypt governorates: (35.6) in Fayoum and Beni Suef; (34.7) in Menya, (34.2) in Assuit, (33.9) in Sohag and (32.6) in Qena (CAPMAS, 2016, p. 68).

In fact, such higher levels of population growth due to higher fertility rates in Upper Egypt were dominant not only in the beginning of the 21st century, but also during the second half of the 20th century (El Zamly, 2016, pp. 201-203).

Figure (2) indicates the actual population geographical distribution in Upper Egypt Governorates, according to the last available data of 2006 population census. Clearly evident is the fact that all population in Upper Egypt are highly concentrated on the Nile Valley, leaving large desert areas in both the eastern and western deserts uninhabited.

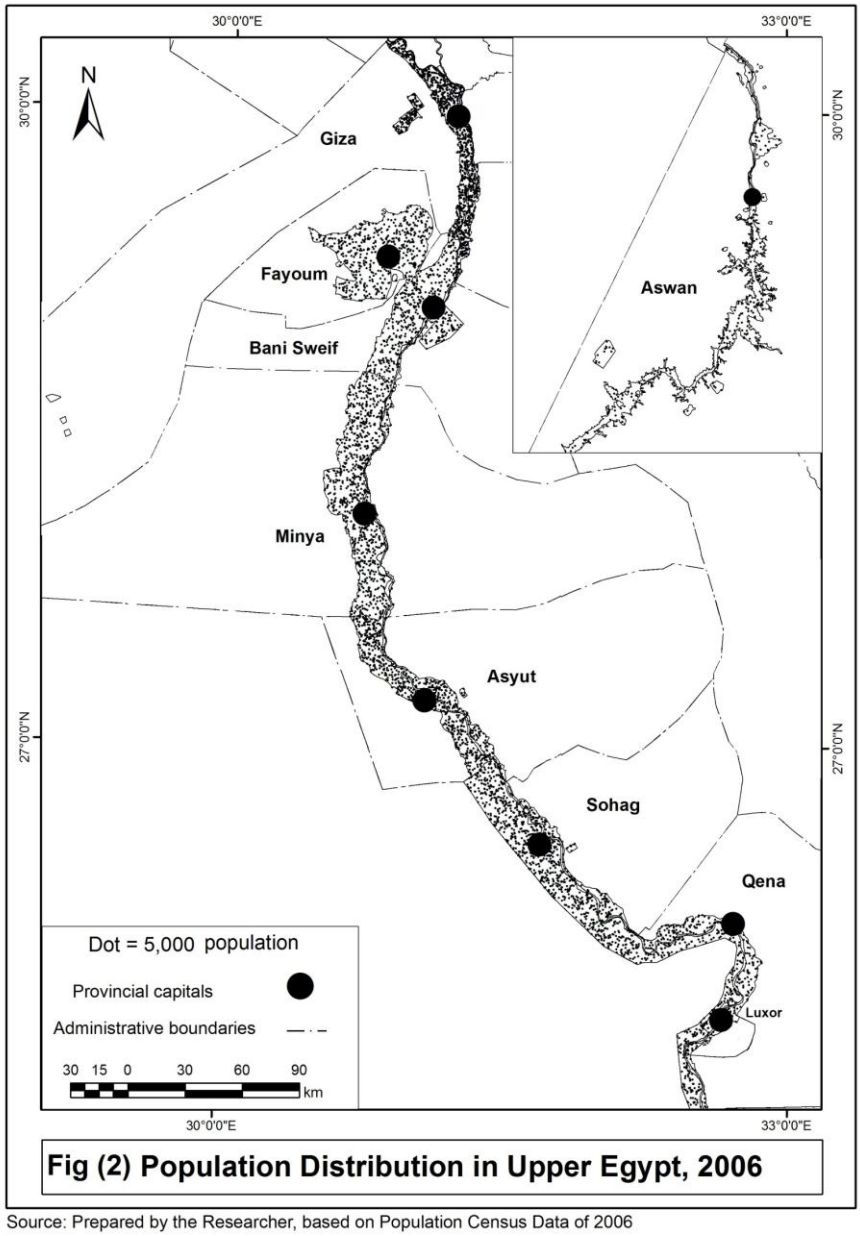


Fig (2) Population Distribution in Upper Egypt, 2006

Source: Prepared by the Researcher, based on Population Census Data of 2006

As indicated in Table (1), the total number of population in Upper Egypt is expected to be about 33 million in the 9 governorates in 2017, with an average of 3.7 million per governorate. However, imbalance of population distribution can be simply observed from the great difference between the largest governorate in the north (Giza with about 8 million in 2017) and the smallest one in the south (Aswan with only about 1.5 million in 2017). As for the remaining governorates, the population number is expected to range from 5 million in Minya, to 3 million in both Beni Suef and Fayoum. By 2027, it is expected to have about 38 million in the 9 Upper Egypt governorates, with an average of 4.3 million per governorate. Unless a sound population redistribution policy is carried out, this imbalanced population distribution will remain the same for decades to come.

Table (1): Expected Population Numbers by Year and Assumption in Governorates of Upper Egypt, 2017-2027 (000,s).

Governorate	2017			2022			2027		
	low	average	high	low	average	high	low	average	high
Giza	7752	7863	7930	8351	8524	8675	8889	9112	9358
Beni Suef	2750	2800	2826	2938	3017	3082	3101	3203	3312
Fayoum	3043	3095	3124	3258	3342	3412	3449	3556	3672
Menya	5107	5198	5246	5503	5651	5771	5860	6051	6258
Assuit	4205	4285	4328	4528	4660	4766	4815	4986	5170
Sohag	4394	4472	4515	4649	4778	4881	4856	5031	5208
Qena	3588	3652	3687	3824	3925	4007	4023	4150	4286
Luxor	573	583	589	624	640	653	671	691	712
Aswan	1409	1431	1445	1492	1527	1556	1561	1605	1651
Upper Egypt	32821	33379	33691	35167	36064	36803	37225	38385	39627
Egypt	86584	87981	89007	91656	93938	96117	95980	98904	102367
(%) Upper Egypt	38	38	38	38	38	38	39	39	39

Source: INP (2010) "Population Projections and Major Demographic Features at the Governorate Level in Egypt, 2012-2032". Cairo: INP, (Planning and Development Issues Series, No., 221), pp. 21-29.

2-3 Population Movements (Internal Migration):

In general, all studies of internal migration in Egypt agree upon the fact that all Upper Egypt governorates – except for Giza – are pushing areas. Also, it is well documented that migration streams have been continuous for decades, from all Upper Egypt governorates to other governorates in general, and to Greater Cairo – including Giza – in particular. In Egypt, internal migration is known to be mostly familial, as percentage of females among migrants ranged from 43% for Menya and Assuit to 49% for Luxor (recently

separated from Qena). As a result, family migration imposes more pressures on the demand for housing units, which is mostly satisfied in random housing areas around Greater Cairo (El Zamly, 2016, pp. 195-199; Hasaneen, 2009, pp. 153-159; INP, 2011, p. 84; Zayyan, 2001, pp. 1-25).

As indicated in Table (2), Upper Egypt governorates lost about 685 thousand person, while Giza alone gained about 374 thousand person, during the period 1996-2006. Clearly evident is the fact that there is a double obstacle, where population of Upper Egypt is agglomerating at the head of the region in the north, in Giza, which faces Cairo locating on the east bank of the River Nile. In Turn, this aggravates the chronicle problems from which Greater Cairo is suffering.

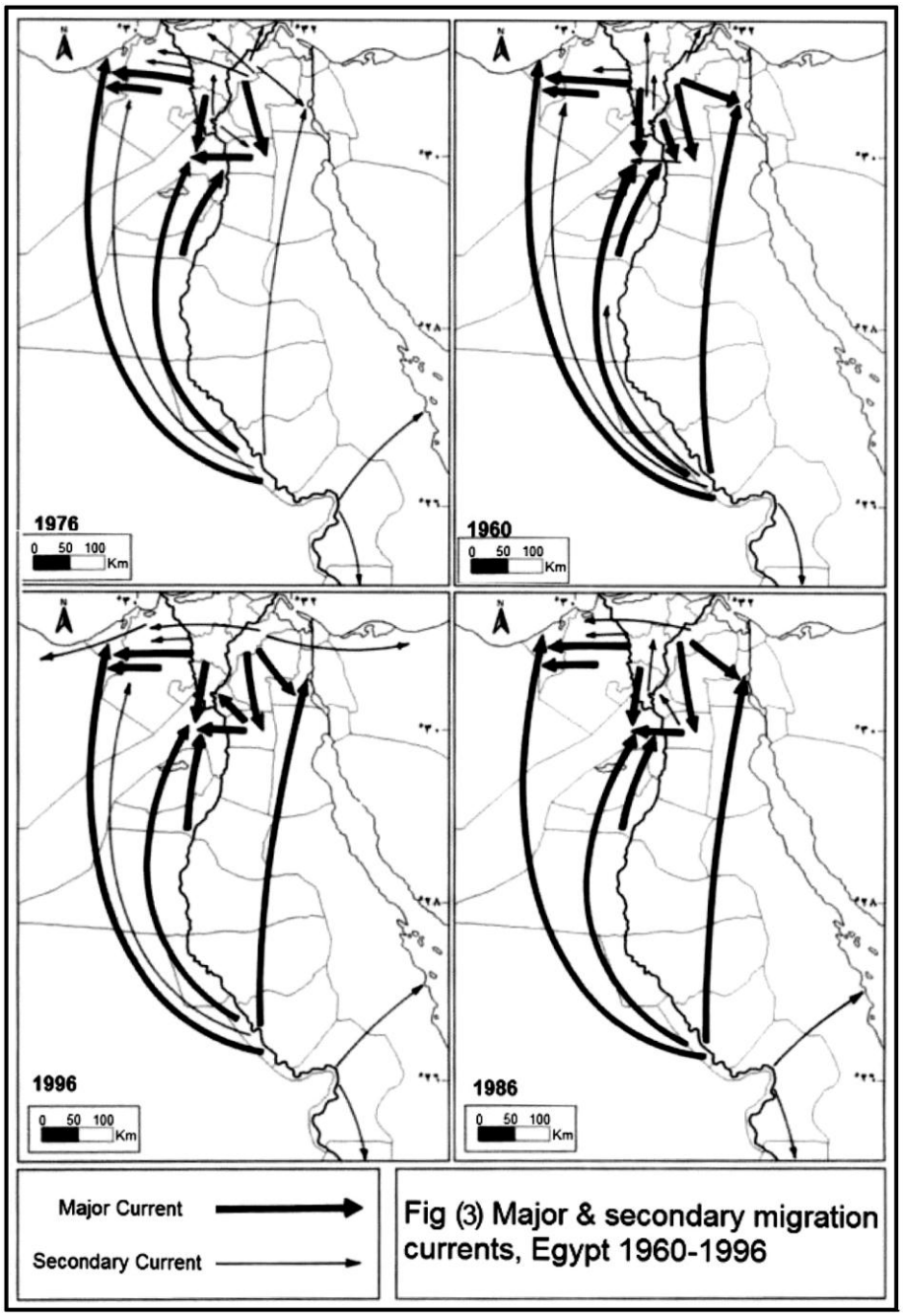
As for the second half of the 20th century, 1960-1996, Figure (3) indicates the major and secondary internal migration currents for Upper Egypt governorates, where almost all Upper Egypt governorates are pushing governorates to other regions, especially to major urban governorates and large cities. Such trends are expected to continue in the future, unless sound balanced regional development strategies are adopted.

Table (2): Estimates of Net Internal Migration by Sex in Governorates of Upper Egypt, 1996-2006.

Governorate	Male	Female	Total	% Female
Giza	+ 199463	+ 174505	+ 373967	47
Beni Suef	- 45705	- 38837	- 84542	46
Fayoum	- 26762	- 25487	- 51349	48
Menya	- 43258	- 33128	- 76386	43
Assuit	- 95680	- 72468	- 168148	43
Sohag	- 144281	- 96574	- 240855	40
Qena	- 36215	+ 23427	- 59642	39
Luxor	+ 11015	+ 10607	- 21622	49
Aswan	- 586	- 3496	- 4082	86

Source: INP (2011) "The Role of New Cities in Geographical Population Redistribution in Egypt", Cairo: INP, (Planning and Development Issues Series, No., 229), p. 84.

Generally speaking, it is well-established in internal migration studies that the most important motivation to move from rural to urban areas is seeking for job opportunities with higher income and better life conditions. In the case of Egypt, however, it seems that the housing problem in rural areas became another motive for migration from rural areas, as there are no more lands available for building new houses in almost all the Egyptian villages.



Source: Hasaneen, Mohammed Ahmed Ali (2009) "Internal Migration in Egypt During the Period 1960-1996: Geographical Study", Unpublished Ph. D. Thesis in Geography, Faculty of Arts, Cairo University.

2-4 Estimates of Annual Needs of Housing Units in the Governorates of Upper Egypt, 2015-2022:

Taking the high population growth and the high rate of family formation into account, a recent study presents a detailed estimation of the number of housing units needed along the following few years, up to 2022. The annual number of housing units needed is not confined to satisfaction of demand for new housing units for newly formed families (92%). Rather, it includes housing units to be constructed for the purposes of replacement (0.9%) and reserves (7.1%). Table (3) indicates that the annual number of new housing units needed for all purposes in Upper Egypt ranges from more than 180 thousand units in 2015 to more than 200 thousand units in 2022. In fact, this is a very large number, which exceeds the absorptive capacity of traditional housing areas in both urban and rural areas in Upper Egypt. Hence, it may be considered the basic reason behind building on the agricultural lands in the old villages, on the one hand, and appearance of random housing areas on the margins of old cities, on the other. As a result, it may be useful to deal with the problem of building on traditional agricultural lands in the following section.

Table (3): Estimation of Housing Units Needed for Egypt and Upper Egypt, 2015-2022 (000,s).

Year	Estimated Population	Increase in Population	Increase in Family Number	Housing Units Needed	
				For Egypt	For Upper Egypt
2015	86737	1700	436	475	181
2016	88471	1735	445	485	184
2017	90240	1770	454	494	188
2018	92026	1786	458	499	190
2019	93848	1831	467	509	193
2020	95706	1858	476	519	197
2021	97600	1894	486	529	201
2022	99532	1932	495	540	205

Source: INP (2011) "The Role of New Cities in Geographical Population Redistribution in Egypt", Cairo: INP, (Planning and Development Issues Series, No., 229), p. 89.

2-5 Building (and Demolishing) Houses on Traditional agricultural Lands:

As a result of rareness of lands available for building new housing units to satisfy the increasing demand of the growing population, especially in rural areas, many individuals resorted to building on the traditional agricultural areas. In fact, this national disaster is taking place day and night, in the open air, before both citizens and officials. According to official reports issued by Ministry of Agricultural, the total number of cases of aggression on agricultural

lands in Egypt as a whole amounted to 1.039 million cases, wasting about 44.824 thousand feddans, during the period from 25/1/2011 to February 2013 only. Moreover, the most recent data indicates that the total number of such cases increased to about 1.555 million cases, wasting about 68.579 feddans. However, only 314 thousand cases, covering 18 thousand feddans, representing only 26%, have been removed lately. The overall size of the disaster amounts to 2.5 million houses, about 62% of which are inhabited and have electricity and water facilities (Atteya, 2016). Unfortunately, this process is still going on, leading to multiple costs of building, removal, and rebuilding in a vicious circle, on the hope of spoiling the lands to be no longer cultivatable on the part of the farmers, as they have no other alternative.

3. Strategies, Policies, and Projects of Population Redistribution in Egypt, 1977-2017:

It seems that not only concerned agencies were aware of the problem of population redistribution, but there were also many strategies, policies, and programs as for population redistribution, as early as the 1970s. This interest took the form of establishing a series of (17) new cities, on three stages, to begin in 1977, and to be completed in 2017. Even before the end of this process, that was mostly concentrated around Greater Cairo and Delta, another series of (6) national development projects were launched in 1993, to be completed in 2000. Moreover, other two major projects were declared in 1994 and 1997 to be completed by 2017. In fact, the last two projects were supposed to cover Upper Egypt in addition to the Red Sea and the New Valley governorates.

3-1 Construction of the Series of the New Cities in Egypt (1977-2017):

The process of constructing new cities in Egypt began along the last quarter of the twentieth century, from 1977 to 1997. It was planned to construct 17 new cities, on three generations, to be completed by 2017. However, with the exception of the two cities of 15th of May and New Damietta, the occupancy rate of the remaining new cities was less than 50% in the two cities of 10th of Ramadan and New Cairo. In the remaining 13 new cities, the rate was less than 32%. (CDC, 2003, pp. 8-30).

As for the (7) cities of the first generation (1977-2002), it was estimated to contain about 6.115 million person by 2000. However, the seven cities absorbed less than one million (17%) by that date. It is clearly evident that Upper Egypt has no share in the first generation of the new cities, as there was no intention to construct any new cities south of the 6th of October (Giza) up to Aswan. Only in the second generation of new cities (1982-2007) that Upper Egypt began to take share.

Table (4): New Cities by Date of Construction, Area, Population, and Land Use, Egypt, 1977-2007.

City	10th of Ramadan	Sadat	15th May	6th of October	Borg Al-Arab	New Damietta	Al-Obour	Badr	New Beni Suef	New Menya
Generation	First	First	First	First	First	First	Second	Second	Second	Second
Year of Start	1977	1978	1978	1979	1979	1979	1982	1982	1987	1987
Year of Completion	2002	2002	2002	2002	2002	2002	2007	2007	2007	2007
% Uses	%	%	%	%	%	%	%	%	%	%
Housing	5.5	2.8	13.0	4.8	6.7	5.7	14.0	8.4	18.3	2.4
Commercial and Services	1.1	0.7	7.4	3.1	5.6	4.4	11.1	3.2	10.0	1.4
Green areas	1.3	0.6	14.4	1.0	2.5	1.5	6.2	3.5	9.3	0.7
Industrial	2.8	1.6	0.0	2.8	3.0	1.7	9.8	4.2	11.5	1.3
Roads	3.6	2.0	11.1	2.6	3.9	3.6	11.0	3.5	6.0	1.2
Physical Bloc	14.3	7.7	45.9	14.4	21.7	17.0	52.1	22.7	5.1	7.0
Green Belt	85.6	92.3	54.3	85.5	78.3	83.1	50.0	77.4	44.9	93.0
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total Area (km^2)	**388**	**625**	**27**	**360**	**220**	**27**	**43**	**96**	**40**	**84**
Total Population (000,s)	**500**	**500**	**250**	**500**	**510**	**270**	**477**	**280**	**90**	**120**

Source: Ministry of Housing (1989) "New Cities as Lightening Spots on the Map of Egypt", Cairo: Ministry of Housing, pp. 40-154.

3-2 National Development Projects in Egypt, 1993-2017:

In the face of the large population increase, the high population densities, and the imbalanced population geographical distribution, it was inevitable to get out of the old Valley and Delta to new locations in the deserts or at the coastal lines. As stated earlier, there have been 8 large national projects for regional development, including population redistribution, as follows:

1- Sinai Peninsula from 244 thousand in 1993 to 1.5 million in 2000
2- Suez Canal Region from 1.5 million in 1993 to 3.0 million in 2000
3- Red Sea Coast from 109 thousand in 1993 to 700 thousand in 2000
4- North-West Coast, to begin in 1993 to absorb 780 thousand in 2000
5- New Valley from 132 thousand in 1993 to 253 thousand in 2000
6- High Dam Region from zero in 1993 to 700 thousand in 2000
7- South Egypt Project (about 6.9 million, during the period 1994-2017)
8- Toshka Project from zero in 1997 to 3.0 million in 2017.
9- "The Project of Villages of the Desert Hinterland":
from zero in 2006 to 4-6 million in 2012.

As for "The Project of Villages of the Desert Hinterland", the time period of the Project was 6 years: from August 2006 to August 2012. The total costs were LE 5 billion. The total number of villages was 400 villages, of which 138 are housing villages, while 262 villages are agricultural villages. The average population of the village was supposed to range between 10-15 thousands. The Project was supposed to absorb a population number ranging between 4-6 million by 2012. In reality, only the centers of 15 villages were constructed in Upper Egypt (Ministry of Housing, 2016).

In general, the first six projects were supposed to begin in 1993 and to be completed in 2000, with the objective of containing a population number of about 7 million. In reality, nothing has happened in the real life. In particular, the last two projects were supposed to contain about 10 million person in southern Egypt and Toshka by 2017. Again, nothing has been achieved in the real life. In sum, it can be fairly said that Upper Egypt has not enjoyed any benefits from the aforementioned projects (Nassar, 2010, 15; SFD, INP, 2000, 1-13; Ministry of Planning, 1996, 1-18; Abdel-Hamid, 1994, 77-86).

3-3 Construction of Twin Cities in Upper Egypt, 1987-2017:

As started earlier, Upper Egypt had no share in the first generation of the new cities. Even in the second generation, Upper Egypt had only three new cities, to start in 1987 and to be completed in 2007. Although the time span of constructing the three cities amounts to about 20 years, the absorptive capacity of the three cities together was only 310 thousand person. Simply, this figure is far less than the size of most cities of the first generation, which was about half a million on average. As a result, it can be fairly said neither

the first nor the second generation of new cities contributed to remedy the imbalanced geographical population in Upper Egypt. In other words, Upper Egypt had a very low share in both the number of new cities on the one hand, and a very low number of population to be redistributed, on the other (Abdel-Hamid, 1994, pp. 77-103).

Only in 2000, the third generation of (9) new twin cities began to be constructed in Upper Egypt, which were supposed to be completed by 2017. The absorptive capacity of the nine cities together was about one million person only, geographically distributed on a longitudinal strip for about 750 km. Again, the planned population number for the nine cities together is nearly equal to the number of only two cities of the first generation surrounding Greater Cairo. As a result, the imbalanced geographical population distribution, in Egypt in general, and in Upper Egypt in particular, is expected to aggravate in the near future.

Most importantly, there is an important observation as for the locations of the new cities in Upper Egypt. With the exception of new Fayoum, Toshka, and East Oyanat – that are naturally located far from the Valley in the western desert – seven of the remaining new nine cities are located on the eastern bank of the River Nile, while only two cities are located on the western bank of the Nile, as indicated in Table (5) and Figure (4).

Needless to say that construction of a new city on the eastern bank of the River Nile necessitates constructing a bridge over the river. Moreover, such a process consumes a lot of time and resources for construction and maintenance. On the other hand, the new city will serve only those living in the opposite old cities, as there are about 20 km on average between most cities in Upper Egypt. This was very clear from the beginning of building the first two new cities on the eastern bank (New Menya and New Beni Suef), where the distance between the two cities is about 120 km.

Only recently, in 2016, a new large bridge is constructed to link not only the two banks of the River Nile, but also the eastern and western desert roads at Bani Mazar, between Beni Suef and Menya.

By contrast, most of the population, labor force, agricultural lands and economic activities are concentrated on the western bank of the River Nile. Hence, it would be easier, faster, and cheaper to establish new communities (cities and villages) west of the western desert highway at the margin between agricultural lands and the beginning of the western desert. In this case, it would be possible to construct many new twin communities without the need to construct bridges over the Nile.

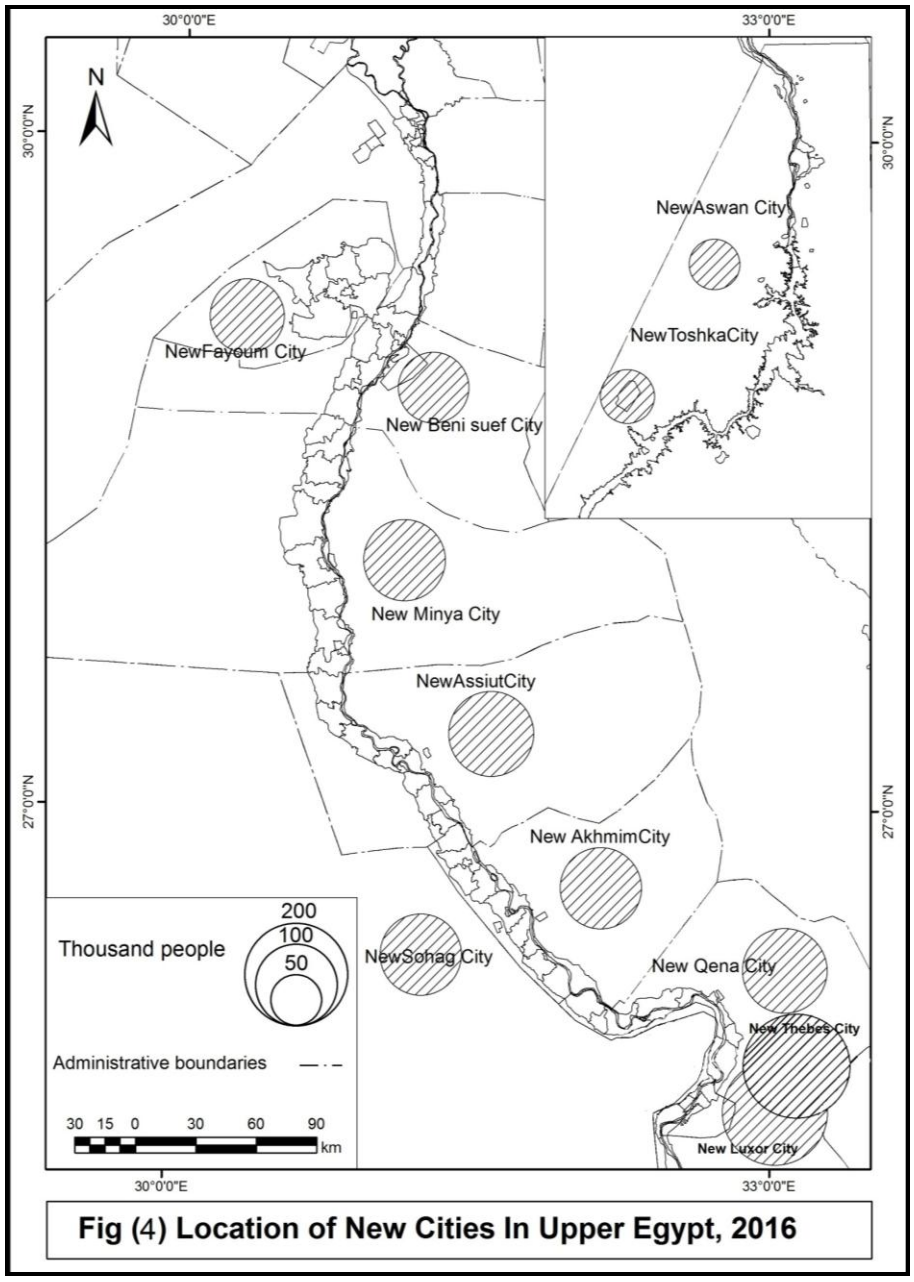


Fig (4) Location of New Cities In Upper Egypt, 2016

Source: Prepared by the Researcher, based on New Urban Communities Authority (2016) .

Table 5. Twin cities by generation, area, population, and location in upper Egypt (1987-2017).

City	Generation	Year of Inception	Year of Completion	Total Area (Feddan)	Urban Bloc	Population (000,s)	Location as for the Nile
New Beni Suef	Second	1987	2007	37.9	5.4	90	East
New Fayoum	Second	1987	2007	13.5	1.7	100	West
New Menya	Second	1987	2007	24.6	6.5	120	East
New Saffa/Assuit	Third	2000	2017	30.3	6.6	131	East
New Akhmim	Third	2000	2017	34.9	3.0	120	East
New Sohag	Third	2000	2017	31.0	7.0	120	West
New Qena	Third	2000	2017	24.2	7.7	130	East
New Teba	Third	2000	2017	9.5	2.8	195	East
New Luxor	Third	2010	2017	9.0	3.5	200	East
New Aswan	Third	1999	2017	22.4	3.3	70	West
New Toshka	Third	2000	2017	10.0	3.3	80	West
North Oyanat	Third	2000	2017	n a	1.1	45	West

Source: New Urban Communities Authority (2016) www.newcities.gov.eg/.

3-4 Optimum Size of the New Communities Suggested for Upper Egypt:

The optimum size of a community is a relative matter, depending on the location of the community, its relations to neighboring communities, and its nature and objectives, among others. In Egypt, many new cities have been constructed with population ranging from 250 thousand to 500 thousand. In Upper Egypt, the number of population in new cities ranges from 70 thousand to 200 thousand, indicating that the largest new city in Upper Egypt is still smaller than the smallest new city in the country as a whole.

In sum, it can be stated arbitrarily that the optimum size for population in new cities suggested for Upper Egypt can range from 100 to 200 thousand, depending on the city area and the relative shares of land uses, especially that of the "green belt", if the housing patterns allows for suitable green areas inside the urban area (Allam, 1991; Allam, 1998, 2-12).

4. The Features of the Project Proposed for Population Redistribution in Upper Egypt:

According to the current situations – that can't be sustainable – as for the high and increasing population densities in both urban and rural areas, unavailability of lands suitable for building new houses in old inhabited areas, the high and increasing rate of aggression on agricultural lands, on the one hand, and the availability of large areas of desert areas along the Valley and Delta, on the other, it becomes clear that going out to such desert areas is the last and only resort available. In the case of Upper Egypt in particular, however, the question becomes whether to construct the new communities on the eastern or on the western bank of the River Nile. Taking into consideration the extent of success of aforementioned formal strategies of "Development Regions" and "New Cities", compared with the success achieved by communities established by the NGOs (Zayyan, et al., 1998; Zayyan, 2001; Shoshan, 2003), the features of the project proposed for population redistribution in Upper Egypt can be stated as follows:

- Choice of locations of proposed communities on the west of the western desert highway, parallel to the old communities, at the crossroads relating old communities to the western desert highway.
- Determination of the optimal model for the proposed new communities, as for the areas, population numbers, numbers and patterns of housing units, and services provided.
- Adoption of the desert construction models as for the housing units in particular.
- Applying the NGOs cooperative model of "New Basaisa" for constructing twin communities, to be cooperatively adopted by individuals at their expenses which were dissipated on building (and demolishing) on agricultural lands.
- Beginning with the transfer of all secondary schools from old to new communities, to decrease class densities in primary and prep schools in old communities.
- Transferring all governmental agencies in old, divided, or hired buildings.
- Adoption of the modern systems of new and renewable energy (solar and biogas energy), in addition of recycling solid wastage.
- Beginning the cultivation of trees suitable for desert areas, even before the beginning of constructing the new communities, depending on waste water of old communities.

Conclusions

- The Upper Egypt population growth is still high, and the population geographical distribution is very imbalanced.
- There are no more lands in both old cities and villages for building new and sustainable housing units in Upper Egypt.
- The problem of building (and demolition) on agricultural lands in Egypt represents a matter of life or death for the Egyptians.
- The present pattern of random housing areas in cities and villages is not sustainable.
- The traditional Egyptian villages are no longer capable to grow without aggression on traditional agricultural lands.
- Individuals will continue to build on traditional agricultural lands, unless there is a clear-cut stand on the part of the society.
- Upper Egypt governorates and regions are still suffering low levels of development indicators and population characterisitcs.
- Upper Egypt will continue pushing migrants to other regions, unless development and housing projects are carried out there.
- Upper Egypt enjoys vast areas of desert lands suitable for establishing development and housing projects.
- Desert building engineering is the most suitable for construction of new communities in Upper Egypt.
- Modern technology can be adopted in new desert communities to generate new and renewable clean energy sources.

Recommendations

- Preventing building in old cities, especially at the margins close to agricultural lands.
- Preventing building on agricultural lands in old villages for any reason.
- Establishing new twin cities (and villages) at the western desert highway, from Giza to Aswan.
- Adopting the desert housing pattern (Hassan Fatehy engineering) to reduce costs and energy consumption.
- Relocating specific governmental agencies from old to new communities.
- Relocating boys secondary schools from old to new communities.
- Utilizing the evacuated buildings of secondary schools to decrease densities of primary and preparatory schools in old communities.
- Adoption of new and renewable energy sources, such as solar energy and biogas.
- Establishing factories for wastes re-cycling at suitable sites in new communities.
- Declaring a clear-cut stand as for no conciliation with building on agricultural lands, and imposing severe penalties up to land confiscation.

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