INFLUENCE OF URBAN ENCROACHMENT ON AGRICULTURAL INCOME IN BIBA CITY

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Abstract

The over population is considered to be the most important problem facing Egypt in the current and next century which fizzle out every effects for future development. The urban encroachment on cultivated soils is a result of the over population which leads to increase the gap between production and demand of food. The government should think hardly to find out non-traditional solutions to prevent the urbanization on productive soils soon and keep it from deterioration. On the other hand, land reclamation programs in Egypt move with slowly steps due to their high cost and do not achieve the demanded results.

Biba city, Beni Sweif governorate, in the north of Upper Egypt was selected to study the rate of loss in productive soils by urbanization impact during the period from 1947 to 2004.

The urban areas were estimated in years 1947, 1985 and 2004 using detailed maps of scale 1:2500 established in 1947, aerial photographic maps of scale 1:2500 produced in 1985 and the maps extracted from landsat of scale 1:2500 covering the same area produced in 2004.

The study revealed that the urban areas were 104.3, 135.7 and 158.85 feddan in the years 1947, 1985 and 2004 respectively, with an increasing rate of 1.22 feddan/year (1985 - 2004) and loss of cultivated soil with a rate of 0.83 feddan/year (1947 - 1985) and 1.22 fed./year (1985 - 2004).

The study showed that, increasing population percent by 24.97% leads to increase the population density to 363 person/fed, compared with the national rate (150 person/feddan) in the period 1985-2004.

The data elucidated also that the loss of the geographical area was 23.15 fed which equals 46.30 fed. of the cropped area; considering that the area is cultivated twice yearly. The estimation average of annual agricultural production return of such area ranged from 3247.82 L.E. to 150362 L.E. yearly for the total lost area (1985-2004).

To safeguard the productive agricultural soils against urbon encroachment, the following suggestions are recommended:

1. Construction of new cities on desert or land unsuitable for agriculture.
2. Execute, modify and activate family planning programs.
3. Aggravate the punishment of urban encroachment and/or leaving soils uncultivated.
4. Increase the density of population to be 250 - 300 person/fed. by vertical spreading.
5. Fix and support the protection concept of productive soils, as a source of food.

INTRODUCTION

Nowadays Egypt has an increasing need for food to satisfy the demand of the increasing population. Consequently, the conservation of soil and water resources which are the main elements for agricultural production is highly considered.

Indicated that vast areas of the old cultivated productive soils of the Nile delta and valley are lost by urbanization, such loss can not be compensated by reclamation of desert lands, as they need too much money and long time to become marginally productive.

Agricultural lands in Egypt are facing complex problems regarding desertification processes; among them is the loss of many thousands of feddans yearly from the highly fertile productive soils as a result of urbanization enchonchment. The major cases, in Egypt, is mainly due to the rapid population growth rate in particular as well as to the massive migration to urban areas.

According to Abdel Hadi *et al.* (1983), the new expansion in the desert area results in a weak income; while the old cultivated productive lands of the delta and valley in Egypt are lost by urbanization.

Abdel Halim *et al.* (1996) reported in their studies on Kafr El Sheikh, Dekernis and Minia cities, that settlement areas generally increases from 180 fed. to more than 2000 fed. in the period of 1947 - 1989 on good cultivated fertile soils.

Khalil *et al.* (1999) reported that in El - Mahalla El-Kobra city, Gharbia-Governorate, urbanization growth rate increased with elapse of time and figured out to be 10.3 and 32.6% yearly, during both periods of 1950-1987 and 1987-1995, respectively with reference to the acreage of urban and agricultural areas.

Fahim *et al.* (1999) in their studies on Tanta city recorded that urbanization growth rate during the period 1950-1987 was 9.2% yearly. However, in the period 1987-1995 it scored a figure of 18.8%/year was observed.

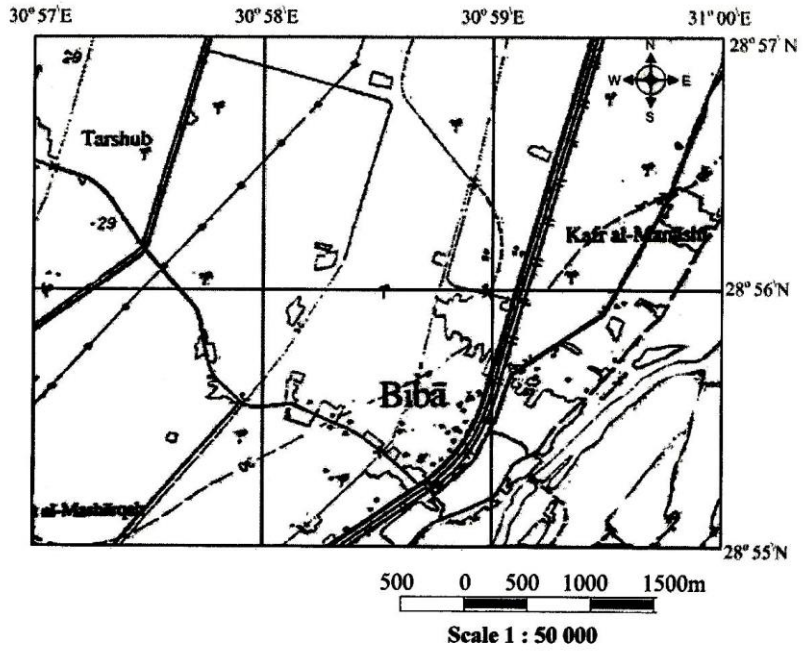
Salem *et al.* (2001) reported in their studies on Damanhour city, Bahaira Governorate, that the urban areas were 127, 630, 711 and 1828 fed. in years 1911, 1959, 1985 and 1998, respectively, with yearly increasing rate of 10.3 fed. (1911-1959), 3.1 fed. (1959-1985) and 85.9 fed. (1985-1998). Their study cleared that, the loss in the geographical area was 1117 fed., which is equal to about that 2234 fed. as cropping area, and consequently lead to a yearly loss of strategic agricultural crops equal to about 2,028,192 to 5,103,707 L.E.

Nashida (2003) reported in her study on Kafr El-Zaiat city, Gharbia governorate, that the urban area was 364.71, 619.05 and 968.47 fed. in years 1935, 1985 and 2001, respectively, with yearly increasing rate of 5.09 fed. (1935-1985) and 21.8 fed. (1985-2001). Her study cleared that, the loss in geographical area was 349.42 fed.

which equals 698.84 fed. as cropping area and lead to a yearly loss of strategic agricultural crops of about 1,520,975 to 4,330,969 L.E.

Abdel Nabi *et al.* (2003) in their study on Osim city, Giza Governorate, indicated that the urban area was 114, 330.29 and 544.29 fed. in years 1935, 1985 and 2000 respectively, with an annual increasing rate of 4.33 fed. (1935-1985) and 14.27 fed. (1985-2000). Their study pointed out that the loss of the geographical area was 214 fed. which is equivalent to 428 fed. of cropping area, providing estimated loss between 821,754 and 2,652,625 L.E.

The main goal of this study is to follow up the urbanization growth of Biba city and to estimate its impact on the highly productive cultivated soils, using cadastral base maps and aerial photographs. Also, in general, to evaluate the loss in national production from the strategic crops as a result of loosing the productive agricultural soils.



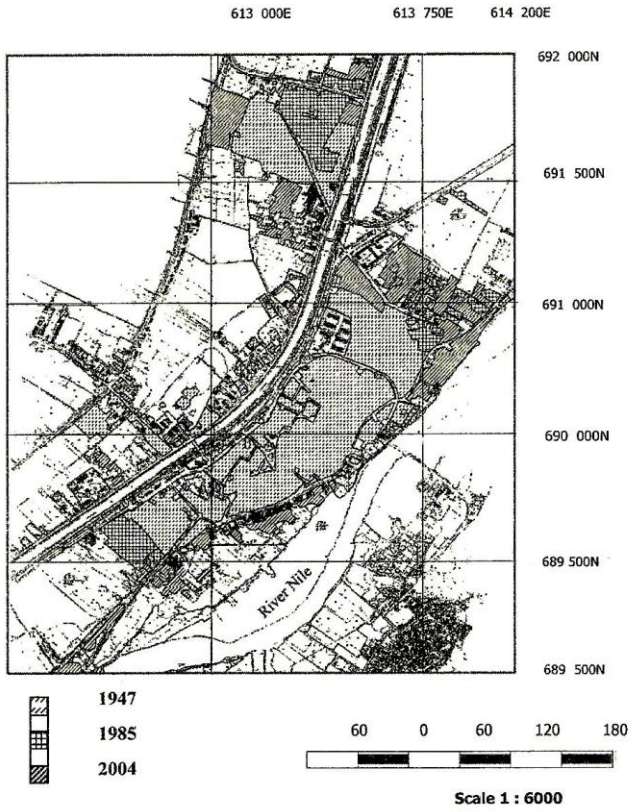
Map 1. Location of Biba City.

MATERIALS AND METHODS

The investigated area is located in the west of River Nile, in Middle of Bani Souf Governorate. It lies essentially on crossing of longitude and latitude 30° 59\ E and 28° 55\ 30\\ N respectively, (Map 1).

The following steps outline the elements applied in the current study:

1. Delineating the boundary of the urban area on base maps scale 1:2500, covering the selected area, published in 1947 by Egyptian General Survey Authority, (EGSA).
2. Interpretation of aerial photographs scale 1:2500 covering the same area produced in April 1985 by Military Survey Authority.
3. Delineating the boundary of the urban area on base maps scale 1:2500, covering the selected area, produced in 2004 by landsat.



Map 2. Urban encroachment in Biba city; years 1947, 1985 and 2004.

Table 1. Urban encroachment and density of population in Biba city up to 2020.

Year	Area (fed.)	Difference (fed.)	Rate Fed/yr	Increasing %	Population (person)	Increasing %	Density of population person/fed.
1947	104.30				29575		283
1985	135.70	31.40	0.83	30.11	46187	56.17	340
2004	158.85	23.15	1.22	17.06	57718	24.97	363
2020*	178.37	19.52	1.22	12.29	69635	20.65	390

* Estimated

Table 2. The total loss in the strategic crops and national income as a result of urban growth in Biba city.

Crops	The losing for fed. (L.E.)	Area loss (fed.)	Area production loss (fed.)	Total loss (L.E)
Cotton (Quintar)	3865	23.15	46.30	178960
Wheat (Ardab)	2731	23.15	46.30	126450
Rice (Ton)	4172	23.15	46.30	193117
Maize (Ardab)	2564	23.15	46.30	118735
Onion (Ton)	2907	23.15	46.30	134548
The Mean*	3248			150362

* Mean production of feddan of some crops and their price (LE) 2004, according to agricultural statistics (2004)

RESULTS AND DISCUSSION

The total urban area as shown in Table 1, and map 2, was 104.30 fed. in year 1947. This area extended to 135.70 and 158.85 fed. in years 1985 and 2004 respectively.

In the first period, from 1947 to 1985 (38 years), the loss of the highly productive cultivated land was 31.40 fed. with an annual rate of 0.83 fed./year. The increase of the urban area was about 30.11%, according to the base area recorded in 1947 (104.30 fed).

During the second period, from 1985 to 2004 (19 years), the urban encroachment, which was detected by field study using modified aerial photograph maps, reached 23.15 fed. of productive cultivated land, with an annual rate of loss of 1.22 fed./year. The increasing percentage of urbanization amounted to 17.06% (Table 1) with respect to the area recorded in 1985 (135.70 fed.).

Comparing the increase of the urbanization 17.06 % with the increase of population (24.97 %) in the period from 1985 to 2004 it is clear that the urban encroachment is less than the requirements of population increase.

The encroachment area expected to be 178.37 fed. and having population of 69635 person at year 2020. In other words the density of population will be 390 person/fed. at year 2020 and this indicates that the encroachment growth is far less than the requirements for housing.

Table 1 reveals that the density of population in 1985 was 340 person/fed. and became 363 person/fed. in 2004. This figure is considered very high in comparison with the standard international rate which is 150 person/fed., according to the law No.3, year 1982 of physical planning. Increasing the density of population per feddan is suggested through replacement and renewal of houses having one or two floors to be three to five floors. The density of population should become about 250 person/fed. at least.

Table 2 shows that the productive agricultural land loss during the period from 1985 to 2004 is 23.15 fed. which is equivalent to 46.30 fed. Of cropping area, considering that the productive soils are cultivated twice during a year. Consequently estimation of annual losses of strategic crops, e. g. cotton, wheat, rice, maize and onion, are amounted to be 325.95 quintar of cotton, 871.37 ardab of wheat, 189.78 ton of rice, 1132 ardab of maize and 585 ton of onion. The products worth about 118735 L.E. to 193117 L.E. This result agree with those in Damanhour and Osim cities, where Salem *et al.* (2001) found that in Damanhour city, Bahaira Governorate, the total loss every year was about 2,028,192 L.E. to 5,103,707 L.E. due to the urban encroachment (1117 fed.). On the other hand, Abdel Nabi *et al.* (2003) reported that

in Osim city, Giza Governorate, the total loss every year was about 2,652,625 L.E to 5, 821,754 L.E, due to the urban encroachment (183.3 fed.).

However, the urban encroachment in Biba city is relatively slow (23.15 fed. through nineteen years) compared with that in Damanhour city (1117 fed./year) and Osim city (183.3 fed./year), which are relatively clearly fast. Generally, the degree of urban encroachment in any governorate may be an indication not only about the price of land due to its uses in different investment fields especially building and housing; but also about the total income of the people.

In order to protect the productive agricultural soils against urbon encroachment the following points are recommended:

1. Construction of new cities on desert or land unsuitable for agriculture.
2. Execute of family planning programs.
3. Aggravate the punishment of urban encroachment and/or leaving soils uncultivated.
4. Increase the density of population to be 250 - 300 person/fed. by increasing the floors of existing houses by one or two floors to be four or five at least.
5. Fix and support the protection concept of productive soils, as a source of food.

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أثر الزحف العمرانى على الإنتاج الزراعى فى مدينة ببا

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يعتبر التضخم السكانى من أهم المشكلات التى تواجه مصر حاليا ومستقبلا ويقضى على كل آمال التنمية المستقبلية حيث أن الزحف العمرانى على الأراضى الزراعية المنتجة هو نتيجة المشكلة السكانية والتى ساعدت على زيادة الفجوة بين انتاج الغذاء وإستهلاكه . يلزم التفكير جديا فى وضع حلول غير تقليدية لوقف الزحف العمرانى على الاراضى الزراعية فوراً والحفاظ عليها من التعدى ذلك أن عملية استصلاح الأراضى فى مصر تسير بخطى بطيئه نسبياً نظراً لتكلفتها العالية كما أنها لا تحقق النتائج المرجوه.

تم إختيار مدينة ببا (محافظة بنى سويف) إحدى مدن شمال الصعيد لدراسة مقدار التآكل فى الأراضى الزراعية بالزحف العمراني في الفترة بين عامى ١٩٤٧ حتى ٢٠٠٤.

قدرت مساحة العمران فى مدينة ببا فى الأعوام ١٩٤٧، ١٩٨٥، ٢٠٠٤ وذلك باستخدام الخرائط المساحية ١/٢٥٠٠ المعدة عام ١٩٤٧ وخرائط التصوير الجوى بمقياس ١/٢٥٠٠ عام ١٩٨٥ وكذلك الخرائط المستخرجة من الاقمار الصناعية بمقياس ١/٢٥٠٠ المأخوذه لذات المنطقه عام ٢٠٠٤ وأوضحت النتائج أن المساحة العمرانية كانت ١٠٤,٣، ١٣٥,٧، ١٥٨,٨٥ فدان فى الأعوام ١٩٤٧، ١٩٨٥، ٢٠٠٤ مع معدل زيادة سنوية فى المساحه العمرانيه قدره ١,٢٢ فدان (١٩٨٥ – ٢٠٠٤) ومعدل نقص سنوى للارض الزراعيه يساوى ٠,٨٣ فدان/عام خلال الفتره من عام ١٩٤٧ حتى ١٩٨٥.

أوضحت الدراسه أن الزياده فى النسبه المئويه للسكان كانت ٢٤,٩٧٪ مما أدى إلى زياده الكثافه السكانية على الفدان عن المعدل العالمى (١٥٠ نسمه/فدان) حيث بلغت الكثافة السكانية ٣٦٣ نسمه/فدان فىعام ٢٠٠٤.

أوضحت الدراسه أيضاً أن الفقد فى المساحه الجغرافيه كان ٢٣,١٥ فدان وهى تمثل ٤٦,٣٠ فدان مساحه إنتاجيه على فرض أن المساحه تزرع محصولين سنوياً وهذا يسبب متوسط معدل خساره سنويه فى الإنتاج تتراوح بين ٣٢٤٧,٨٢ - ١٥٠٣٦٢ جنيه مصرى سنوياً للمساحه المفقوده (٢٣,١٥ فدان).

ومن أجل المحافظه على الأراضى الزراعية الخصبة من الزحف العمرانى يوصى بالمقترحات التالية:

- العمل على إنشاء مدن جديده فى الصحراء والأراضى الغير مناسبة للزراعه.
- تحديث وتنشيط برامج تنظيم الأسره.
- تفعيل القوانين الخاصه بحماية الأراضى الزراعيه وذلك بالإزاله الفوريه للمنشآت المخالفه وتغليظ العقوبه على المخالفين.
- العمل على ضبط الكثافه السكانيه عند ٢٠٠-٢٥٠ نسمة/فدان مع مراعاة البعد الاجتماعي للمكان.
- ترسيخ مفهوم المحافظه على الأراضى الزراعيه وأنها مصدر الغذاء.