

# THE BIRTH RATE AND FERTILITY TRENDS IN EGYPT

## (Summary and Conclusions)

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### INTRODUCTION.

Population problems are of paramount importance. They lie in the foundation of every political, social and economic problem. For a long time mortality has been the main factor in population movements. Now fertility is the main factor. The relation between the two cannot be ignored. In the measurement of population growth—which is the real aim of Demography—the two are equally important.

#### **The Birth Rate in Egypt.**

##### *1.—The Crude Birth Rate.*

We have only about 30 years of reliable Birth Rates of Egypt as a whole. They round about 43 ‰ which is one of the highest all over the world.

It is difficult to find any general trend in the period 1917-1945. It was subject to casual fluctuations; reached a minimum of 37.7 in 1919 and a maximum of 45.4 in 1930. The period 1903-1916 shows a higher level due to the fact that this period is concerned with Egyptians only, the birth rate of foreigners being less than 1/3 that of Egyptians. The main reason, however, is the deficiency in the enumeration of people in the early censuses by a relatively higher degree than that in the registration of births.

To deal with the problem of deficiency in the birth registration a comparison between the urban and rural districts has been made. The birth rate in the urban is 10 % higher. The rural districts of Lower Egypt show a higher birth rate

than in Upper Egypt, the urban show nearly the same. The average birth rates in towns are higher than those of other Health-Bureau Localities, these are higher than those of Localities having no Health Bureaus.

The differentiations in various districts, being signs of deficiency in birth registration, may be indications of real differentiations in fertility. The district of Guiza is the highest, that of Assuan is the lowest.

### 2.—*The Fall of the Birth Rate.*

It has been difficult to trace any general trend of increase or decrease in the Birth Rate of Egypt. The suspected stability no doubt conceals a downward trend if the birth registration is believed to have grown in recent years more efficient. To approach the real position of Egypt in the remarkable phenomenon "The Fall of the Birth Rate", a discussion of history and causes has been made. It has been found that birth control is the fundamental cause. It is closely connected with education and high socio-economic status.

### 3.—*The Masculinity Ratio.*

The ratio of male to female births in Egypt is 106-110, averaging about 108.4 in the period 1917-1945. In Egypt there is no complaint of disequilibrium in the Sex Ratio. However, the Masculinity Ratio in Egypt seems high owing to relative deficiency in the registration of female births. This can be seen from the increase in Masculinity Ratios of rural districts especially those of Upper Egypt. The increase may be due also to bad economic conditions.

### 4.—*Plural Births.*

These are 1 to every 77 births. It has been found that plural births correspond positively to higher ages of parents, especially the age of mother.

### 5.—*Illegitimate Births.*

The data are deficient. They are concerned with localities having Health-Bureaus and deal only with foundlings and babies with father unknown. The ratios of illegitimate births to un-

married women 15-49 and to all births are less than one tenth those found in Western Europe. No doubt there is some deficiency in the registration of illegitimate births, but it is also that our traditions do not accept illegitimate relations before marriage. The highest illegitimate birth rates in Egypt are found in the coastal regions, the lowest in Upper Egypt.

#### 6.—*Still Births.*

Registration here is terribly deficient. One cannot believe that the rate of still births in Egypt is less than one third that in England. Still births are more common in males than in females. The rate increases in the lowest and highest ages of father and mother.

#### 7.—*The Standardized Birth Rate.*

The standardization of birth rates has been briefly discussed. The direct method using an ideal distribution of population has been compared with the indirect method using ideal specific birth rates.

#### 8.—*The Natural Rate of Increase.*

This is very high, about 16 ‰, although the Death Rate is one of the highest all over the world. A grave defect in this rate is that it cannot express the changes in the age structure of population.

### **The Rate of Infant Survivorship.**

The infant mortality in Egypt is very high. The figures are less than reality owing to the deficiency of registration. One fifth of births die under one year. This means a sharp lessening of Egypt's high birth rate. Probabilities of life for male births are less than those for female births. The infant mortality rate in Egypt as a whole is less than that of all localities having Health Bureaus, by nearly 20 %. The deficiency of registration is very obvious in the twelfth month, it is even higher in the dates near birth. The conditions of infant mortality are worse to a greater degree in poor districts, but the deficiency of registration in Localities having no Health-Bureaus showed an inverse position. The construction of life tables for infants under one presented fine results regarding the birth rate itself.

### Miscellaneous Methods for the Measurement of Fertility.

#### 1.—*The Ratio of Births to Marriages.*

Marriage Statistics for all Egypt are found since 1935. This ratio (2.5—3.8) is defective and do not express real fertility. It includes repeated marriages. Illegitimate and legitimate births are taken together. Of course births are not the result of contemporary marriages. In discussing the period 1935-1943 the dispersion of rates is less when more years of marriages are taken. The best is to take the same year and the last six to eight years. If these ideas are considered, the new ratio is 4.4 for 1943.

#### 2.—*The Ratio of Births to Dissolved Marriages.*

The ratio of births to marriages dissolved by death or divorce shows higher rates of fertility, nearly double the ratio to contracted marriages. Owing to the lack of data, this ratio has been computed only for Cairo and Alexandria. It shows higher fertility in Alexandria. Average ratios of births to dissolved and contracted marriages have been computed on different scales.

#### 3.—*Number of Births to every Dissolved Marriage.*

The lack of data is found here. But this rate does not envisage a true picture of fertility because the marriage dissolved by death or divorce is not the typical marriage. The average born to divorced women has been computed for the last and former marriages.

#### 4.—*Number of Births to every Wife in the Census.*

The defects of such a measurement are numerous. Census data required are not available.

#### 5.—*Number of Children in the Census related to Population.*

Sadler's method of relating children under 10 to population 15—39, Willcox's relating children under 5 to population 15—49 and Rossiter's relating children under 10 to average population in the last ten years have been computed for the purpose of regional comparison.

### Social Classes and Fertility.

Sufficient data are not found. Tables showing numbers of live births by occupation of father and order of new born in H.B.L. have been used. It has been estimated that the fertility of the 3 classes correspond to  $1 : 1 \frac{1}{2} : 1 \frac{1}{2}$ . By the application of sampling theories, the differentiations proved significant, showing strong inverse relation between fertility and socio-economic status.

### Fertility and Duration of Marriage.

Because of insufficient data, tables showing numbers of live births by duration of marriage and order of new born in H.B.L. have been used. It has been observed that the numbers of births in the first year are very little (4 % of those born in the second year as against 25 % in England 1914). The difference is due to errors of registration in Egypt and the high figures of legitimized births in England. The average wife brings forth of 40 % of her births before 7.5 years duration, 60 % before 12.5 and 80 % in 17.5 years. The correlation coefficient between the number of births and duration of marriage is + 0.82, the Correlation Ratio + 0.84, the Regression Line is not linear. It can be shown by the equation :

$$Y = 0.299 + 0.508 x - 0.00656 x^2$$

$Y$  being the number of children,  $x$  being the duration of marriage in years.

### The Mean Life in the Period 15-49.

This is essential for the investigations in fertility. Kuczynski's method has been used in the computation. The probabilities of life for males are far less than those of females. The average female born lives during the child-bearing period about 19.7 years in 1917, 20.8 in 1927 and 19.3 in 1937.

### Fertility of Women.

The General Fertility Rate, *i.e.* the ratio of births to women 15—49, is about  $180 \text{ } \text{‰}$ . A grave defect is the lack of data about births by age groups of mother. The Specific Fertility Rates have been computed by using the relative distribution of

births over age groups of mother in H.B.L. The results show continuous increases in the specific fertility rates under 30, relative stability after 30. Then the Total Fertility is computed. It has been seen that the specific fertility rates are deeply influenced by the changes in the relative distribution of births year after year. The figures of total fertility are near one another. By using relative distributions of certain foreign countries, the same result is attained. The specific fertility rates, especially those of lowest and highest ages, are different. The application of specific fertility rates of same foreign countries is tried. All these rates give nearly the same shape of curve with a positive skewness, fertility reaching a peak in the group 25-29. The derivation of total fertility from the general fertility rate gives nearly similar results. The Gross Reproduction Rate is then computed by elimination of male births. The Net Reproduction Rate is calculated by using the mean life of females during the child-bearing period.

	1917	1927	1937
Total Fertility Rate ..	5.5	5.7	5.9
G.R.R. . . . . .	2.7	2.7	2.8
N.R.R. . . . . .	1.5	1.6	1.6

These rates are very high in comparison with those of many European countries where the G.R.R. itself has become less than unity, *i.e.* under the replacement level, even if every woman reaches the age of 50.

For fitting a curve for the specific fertility rates in Egypt, typical average approximate rates have been used:

Age	Specific Fertility Rates
-20 .. . . . . .	75
20-24 .. . . . . .	250
25-29 .. . . . . .	300
30-34 .. . . . . .	275
35-39 .. . . . . .	200
40-44 .. . . . . .	50
45-49 .. . . . . .	30
Total Fertility .. .	5900

The equation of best curve fitting is as follows :

$$y = 267.3810 - 72.2617 x - 24.7024 x^2 + 7.0833 x^3$$

where  $y$  is the specific fertility rate and

$$x = \frac{\text{Age of woman in years} - 32.5 \text{ years}}{5}$$

By fitting a curve for the rate of survivorship of females during the child-bearing period, according to the conditions of 1937, we obtain the equation :

$$y = 555.664 - 9.173 x - 0.249 x^2$$

where  $y$  is the rate of Survivorship for 1000 females born and

$$x = \frac{\text{Age of woman in years} - 32.5 \text{ years}}{2.5}$$

By multiplying the corresponding theoretical results of the two equations for every year in the child-bearing period we have what may be called Net Fertility which equals 3.3. If male births are eliminated we obtain 1.6 for the N.R.R. as previously attained. This rate equals in forecasting a natural rate of increase of 16%.

Specific fertility rates, total fertility and G.R.R.'s for Governorates and Districts in 1927 and 1937 are calculated for the purpose of regional comparison.

### Fertility of Wives.

All measures of fertility graduating from the crude birth rate to the N.R.R. disregard the importance of marriage in fertility. Thus the general fertility, specific fertility rates, total fertility are to be calculated for wives on the same bases previously used. The curve fitting of the Fertility of wives during the child-bearing period gives the equation :

$$y = 34.2 + .4084315 x - .7466656 x^2 + .0299513 x^3$$

where  $y$  is the specific fertility rate per 100 wives 1937 and

$$x = \frac{\text{Age of wife in years} - 25 \text{ years}}{2.5}$$

The computation of the N.R.R. of wives from their G.R.R. has been difficult owing to lack of data. By comparing the

mortality of women over 15 years with that of wives in Cairo and Alexandria the difference is significant. Mortality of wives is 60 % of women's mortality. Applying this result, the average wife lives in 1937 about 20.05 years in the period 15-49 as against 19.30 for the average woman as a whole.

	Child-bearing Period	
	15-49	16-49
Total Fertility of wives 1937..	7.8	7.6
G.R.R.           "       "       ..	3.8	3.6
N.R.R.           "       "       ..	2.2	2.1

This means that the average wife according to the conditions of 1937 produces a little more than 2 girls before she is dead.

Specific fertility rates, total fertility and G.R.R.s for wives in Governorates and Districts in 1927 and 1937 have been calculated for the purpose of regional comparison.

### **The Relation between Fertility and some other Phenomena.**

#### *1.—The Relation between Different Measures of Fertility.*

Spearman's Rank-Coefficient of Correlation has been used in more than 100 cases for the purpose of measuring relations based on regional and time comparisons.

Legitimate and illegitimate rates are weakly correlated. The latter have a strong relation with regions. Correlations for fertility measures graduating from the crude birth rate to the fertility of wives 15-49 are very strong specially between measures which are directly derived one from the other. This is logical because all of them depend on the number of births. Correlation of specific fertility rates according to groups of ages is very strong. For specific fertility rates of wives the same strength is found except in the relation between the group-20 and other groups which is weak. The measurement of correlation between the specific fertility rates of women and wives gives coefficients near unity for middle age groups, very strong for higher ages in the child-bearing period, but very weak for

the group under 20. No doubt there has been some agitation in this group owing to the decrease in early marriages.

Correlation between the fertility of wives 15-49 and Sadler's fertility rates (children -10 divided by Population 15-39) is very weak or may be no relation at all. Sadler's method is defective.

2.—*The Relation between the Birth Rate and the Death Rate.*

Both influence each other. The positive and very strong relation is found out by regional correlations.

3.—*The Relation between the Birth Rate and the Infant Mortality Rate.*

Correlation in Cairo districts 1939 prove positive but not strong. If Infant Mortality Rates 1940 are taken, correlation becomes less strong because the majority of infant deaths occur in the same year of birth and but little in the next year.

4.—*The Relation between Fertility and Seasons.*

The study of monthly birth rates in Egypt 1925-1944 assures real seasonal variations. Birth rates increase in Winter (November-April) and decrease in Summer (May-October). Yule's Coefficient of Association is 0.9.

5.—*The Relation between Fertility and Age at Marriage.*

The influence of marrying early in the lengthening of child-bearing period passed in marital life, the influence of postponement in the increase of sterility and the grave decrease in fertility of women after a certain age, have been discussed.

The difference between the Average Age at marriage and the Mean Age at Marriage computed from Nuptiality probabilities has been discussed also.

6.—*The Relation between Fertility and the Marriage Rate.*

The increase of the marriage rate means increase in early marriages. The relation between the birth rate and the marriage rate in Egypt gives strong positive correlation ; the former lagging 3 years after the latter. Correlation in Cairo districts 1939 gives a Rank Coefficient of + 0.26. If the Divorce rate is subtracted it becomes + 0.57. Marriage rates and divorce rates are in the meantime correlated at + 0.96.

7.—*The Relation between Fertility and the Business Cycle.*

The business cycle influences fertility through the marriage rate and the age at marriage. The influence is quick and direct. Thus 3 years period of lag separates the cycle from the birth rate. The relation between illegitimate fertility and prosperity is inverse.

8.—*The Differentiations of Fertility in Rural and Urban Districts.*

The general wellknown phenomenon is the decrease of fertility in towns than in villages and the tendency to diminish wherever urbanization is found. In Egypt the contrary is noticed owing to the deficiency of birth registration in rural districts. The American demographers over-estimate these differentiations of fertility and look to other differences as mere reflections of them. No doubt these represent only one phase of the problem.

9.—*The Differentiations of Fertility in Social Classes.*

In our study of fertility and socio-economic status the inverse relation is assured. This phenomenon will not last if the poor become accustomed to birth control. The inverse relation between fertility and income, between fertility and education is world famous. In Stockholm the contrary is now reached. Correlating the birth rate and the rate of illiteracy among females over 5 years in Cairo districts 1937 presents a Rank Coefficient of + 0.74.

### **The Future of Population in Egypt.**

1.—*A Glance on the Theory of Population.*

Population theories discussed have been divided to natural (Sadler's theory of Density, Doubleday's true law of population expressing the inverse relation between Nutrition and Reproduction, Spencer's biological theory, *i.e.* inverse relation between Individuation and Genesis, Brownlee's theory of cyclical variations in fertility occurring every 200 years), and social (Malthusianism and Neo-Malthusianism, Ibn Khaldoun's theory expressing the relation between fertility and the rise and fall of the state, Dumont's theory of Social Capillarity and the theory of Optimum Population by Carr-Saunders).

2.—*The Future of Population in Egypt.*

Famous forecasts leading to different estimates have been dealt with. A study of various methods of forecasting has been made dealing with : Extrapolation by the arithmetical or geometrical methods, using the Logistic Curve, curve fitting of Census data available, applying Lotka's Natural Rate of increase, Kuczynski's N.R.R., Bergdorfer's Correct Birth Rate and Death Rate, and the Effective Reproduction Rate.

The demographic position of Egypt has been discussed. Our population is progressive, with a regular pyramid like structure, males and females in equilibrium. There is a tendency of decrease in early marriages.

The Average Crude Birth Rate in Egypt 1917-45	42.35
(Taking into account 10 % deficiency in birth registration and 5 % in the enumeration of population) it becomes .. .. .	44.70
The Average Crude Death Rate in Egypt 1917-45	27-39
(With Infant Mortality raised by 25 % which means a rise of 10 % in the Death Rate, and with 5 % deficiency in the enumeration of population) it becomes .. .. .	28.62
The Average Natural Rate of Increase 1917-45..	14.96
becomes .. .. .	16.08

On the hypothesis that the present conditions in fertility and mortality will continue or that the probable slight decrease will be the same in both, forecasting for Egypt gives an estimate of 78 millions in 2037 based on geometrical annual increase of 16"/<sub>100</sub>. Clyde V. Kiser's estimates for 1970 by using different methods of extrapolating Census figures 1882-1937 are from 18.1 to 20.8. It is certain now that the year 1950 has brought population to 20 millions. Our forecast is strengthened by the application of the N.R.R. 1.6. It is supposed, however, that the rise and survivorship of the State will continue.

3.—*A Plan for Population in Egypt.*

Our forecast is based on the hypothesis that the natural rate of increase will remain as it is, that there will be no increase in mortality as a result of population pressure on our resources. Birth control as a scheme is discussed. Owing to

the slowness of the agricultural progress in last decades', Cleland and the pessimists argue that Egypt is already living under high population pressure. This is not true. The standard of living will not be raised by birth control but by quick economic progress. We are now in the age of planning. Birth control is responsible for the catastrophic fall of fertility in Western countries which arises the problem of fear from the decrease in population. Population plans used by Germany and Italy for military purposes have been discussed. The large size of population is preferable in a world governed by the law of the forest. Our plan is not to interfere in fertility. Egypt's economy should be transferred from the agricultural to the industrial stage. Quality and quantity can be secured.

### CONCLUSION.

To what extent of reliability the results based on our Vital Statistics are not injured by defects in the available data used? The defects which may be summarized in : (1) Shortness of the period covered by Statistics ; (2) Inadequacy of data ; (3) Deficiency of registration ; (4) The lack of demographic informations ; (5) The delay in publishing Statistical Tables, are all found in other countries and can be defeated.

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